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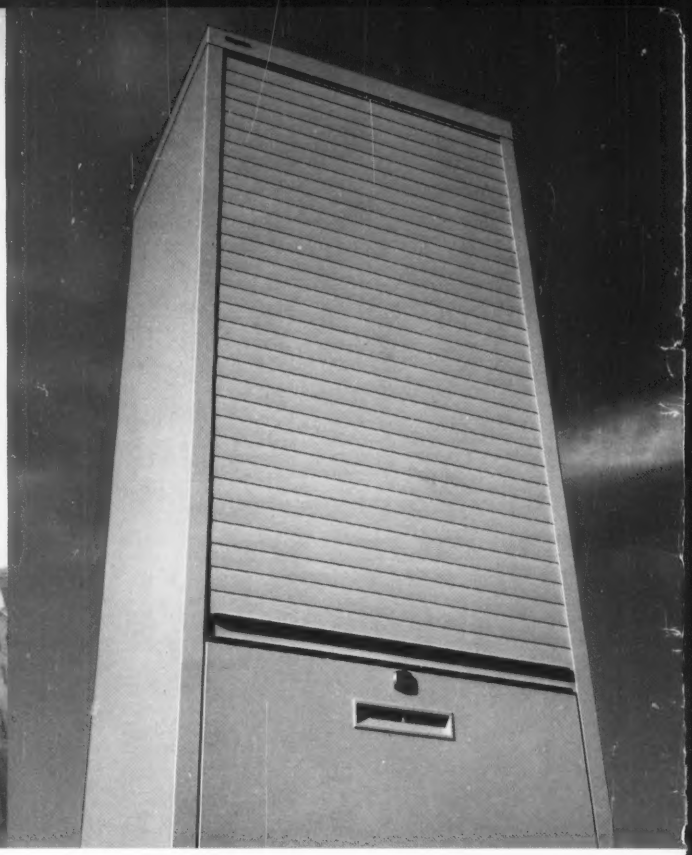

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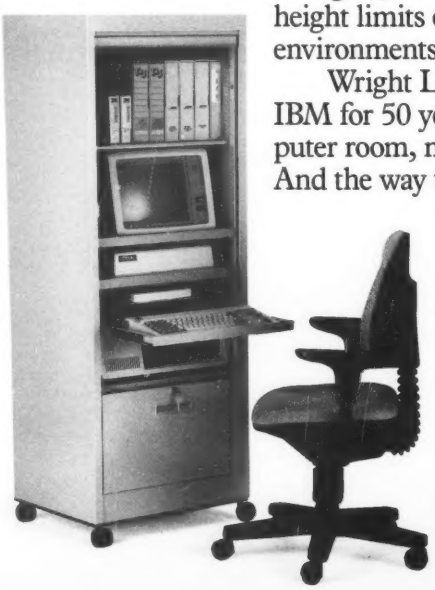

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The backbone of any organization — and a vital link to success — is communicating ideas, information and projections that come as a result of OA. (Photo © 1984 Mort Rabinow)

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OA

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EDITORIAL

The battle over CRT safety is heating up again. No matter how many times we're assured there is no radiation danger from these terminals, users and user groups remain unconvinced.

Bills pertaining to CRT safety have already been introduced in nine state legislatures this year, and two more will reportedly be introduced shortly. Lobbying on both sides of the issue should be intense, with union groups pitted against vendors and big business organizations. In addition to action on the state levels, the U.S. Congress's House Education and Labor Subcommittee on Health and Safety is studying CRT safety.

Although no study has produced scientific evidence that CRTs pose a serious health threat, individual complaints and a number of miscarriages or birth defects continue to be attributed to CRT use.

All parties seem able to agree that some physical ailments — backaches, eyestrain and stress — can be caused by terminal design or work area factors. A recent issue of the Harvard Medical School Health Letter estimated that more than half of all CRT operators suffer from eye irritations, focusing problems and fatigue. Job stress is compounded as operators try to keep pace with a constantly alert computer and to cope with the fact that often their performance is monitored by that same system.

The question of how dangerous CRTs can be will probably go unanswered for some years to come. Continued scientific evidence is needed before we can put the problem to rest one way or another. But we need to address some aspects of the issue now.

Some of the problems can be dealt with on a management level. Management should give more attention to employee needs and fears before computers are brought in. An unhappy, rebellious or physically uncomfortable employee is less productive than one who is satisfied with the working environment. Managers should also encourage better training and more employee involvement in the selection and application of computers. Adjusting the work area to the new needs of employees in an automated environment should be high on employers' priority lists.

Technology itself will help users as interfaces become more sophisticated and screen usage decreases. Voice interfaces may become a normal means of machine communication, thus eliminating many present-day ergonomic problems. Until that time, however, the emotional issues and questions of health and safety of CRT terminals need our attention.

LETTERS

WHERE'S OA?

Yes, I like *Computerworld OA* very much!

My division is currently engaged in a companywide implementation plan for office automation, and your publication provides valuable information to aid in this process.

In the past, I particularly looked forward to each week to the "Office Automation" section of *Computerworld*.

However, although CW OA is an excellent resource, its sporadic publication [six times yearly] would serve your readers best, as it has in the past, if it were an addendum to weekly OA news in CW.

Why, when the integration of data processing and office automation is becoming so critically important, have the editors of CW chosen to eliminate weekly coverage? I hope that either the weekly section will be reinstated or that your publisher will offer a weekly OA publication.

Lorraine A. Drake
Amalgamated Life Insurance Co.
New York, N.Y.

OA HIRING

I have just read "Hiring the Right People" [*Computerworld OA*, Feb. 15], which deals with the problem of finding the right people for office systems positions.

I very much agree with the comments of those quoted regarding the qualifications. However, although the thought of the article very much reflects the needs of the marketplace, it is not indicative of hiring practices on a wide basis.

I have first-hand knowledge of this because the ideal person, as described in the article, could have been me.

I have been seeking a new position for some time now and have found that the great majority of office automation positions do not go to those who possess the attributes mentioned. Instead, specifications for these include large mainframe experience, programming languages, systems development and perhaps data base experience.

After reading the article, I am wondering if I am looking in the wrong places. If that is the case, where might the "right place" be?

James F. Chiodo
Buffalo, N.Y.

TREASURE TROVE

The project team leader of our integrated office study, an outside consultant, was kind enough to give me a copy of your Feb. 15, 1984 issue. I found the magazine to be a treasure trove of information, much of which couldn't be more timely.

I would find it very interesting, however, to hear how you can possibly justify a $71 difference between domestic and Canadian subscription rates for your weekly publication, *Computerworld*.

Jane L. Goto
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BUT I THINK YOU STILL HAVE TO READ THEM.
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HAMMERING IT OUT

By Michael Hammer

"Hammering It Out" will be a regular feature in Computerworld OA *and will attempt to give readers a look at the lighter side of the developing world of OA.*

Mythology and ritual are mankinds's natural responses to forces that we do not understand. For example, primitive man's understanding of the awesome spectacles of volcanoes, earthquakes and the like was modest. He responded with intricate theories of angry gods with intestinal distress. Among the rituals intended to soothe the divine tummies were the sacrifice of maidens and the dismemberment of chickens.

Today, of course, we understand geological phenomena much better, and hardly anyone dismembers chickens any more. However, superstition still reigns in many areas of human endeavor, and the ritual response continues to operate. In particular, office automation is rife with this less-than-rational form of behavior.

I was reminded of this recently when a company asked me to review the corporate office survey it had just completed as part of its OA strategic planning process. (Also sometimes known as activity profiles or time distribution studies.) The company was most proud of this document and of the exhaustive data collection effort that led up to it.

The survey was extremely thorough. It contained detailed analyses of how different classes of office workers spent their time, expressed in terms of a dozen or so activity classes — typing, filing, calculating and so on. They had even broken it down by location and organizational unit and had employed the latest in graphics technology to produce bar charts and other forms of supporting illustration.

The company was so pleased with the product that it would have been in bad taste to ask what the conclusions of the survey actually meant and what the company would do as a result of it. In reality, of course, the results of these surveys are almost entirely devoid of meaning.

If we determine that a typical manager spends 46% of his time in meetings, 22% producing documents, 18% in communication and so on, what have we really learned? Nothing at all. Is 46% too high or too low?

In truth, the office survey as currently practiced is largely an empty ritual, which many organizations perform in response to their confusion about OA. "When in doubt, count," is the order of the day.

Do the statistics tell us why the manager was in a meeting, what it was about and whether or not it was successful? They do not. Let us even suppose that we install an electronic office system that reduces the amount of time spent in meetings. Unless the laws of arithmetic have

OA FORUM

been repealed, the total time distribution must still equal 100%; on what basis do we say the new distribution is better than the old one?

The view of the office on which such surveys are based is obsolete and bankrupt. It is a child's-eye view of the office.

Hammer's Office Survey Form

Name of respondent.....

Percentage of time spent standing up .....

Percentage of time spent sitting down .....

When asked what daddy does in his office, my four-year old will describe my day in terms of typing, filing and talking on the phone. Nothing is literally wrong with her answer, but somehow it fails to capture the nuances of my work.

I have recently developed my own abbreviated office survey form, which can be easily administered to any collection of office workers. It has the advantages of both completeness and brevity. Based on an exhaustive analysis of the results of this kind of survey, I have concluded that the typical office worker requires better shoes and chairs. I submit that my analysis is quite as useful as the more popular forms; neither gets at the real substance and content of an individual's work.

In truth, the office survey as currently practiced is largely an empty ritual, which many organizations perform in response to their confusion about OA. "When in doubt, count" is the order of the day. The office survey has all the appurtenances of ritual: an arcane vocabulary, obscure rites conducted with elaborate forms, lofty debates on theological minutiae (the relative efficacies of assorted questionnaires) and a cult of witch doctors blessing the entire enterprise. (These of course are the consulting firms, for whom office surveys are manna from heaven.) Alas, like most such rituals, this one is conducted more for its own sake than as a reasonable means to a worthwhile end. It makes us feel virtuous, efficient and productive, but it leads nowhere.

This is not to say that data collection has no place in the processes of office systems analysis or corporate OA planning. Of course it does. But data is meaningful only after one has an appreciation of an organization's business mission and business activities. Statistics about volumes of office activities need to be interpreted in the context of what an office is really all about. Ritual can never be substituted for insight and understanding.

Meanwhile, rumor has it that the San Andreas fault is about to let go. If you can spare a couple of chickens, let me know. **OA**

Hammer is president of Hammer and Co., Inc., a Cambridge, Mass., consulting firm that specializes in the strategic implications of new information technologies.

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EDUCATING THE EXECUTIVE

By Judith Wadness

The people in the corner offices need to understand the powers of microcomputers. They realize it; you realize it. Now how do you accomplish this goal?

Executive education is a sensitive and difficult task. It must confront the problem of helping the person in the corner office become knowledgeable about micros without making him look foolish and lose face. Without understanding the uses and benefits of micros, however, executives cannot be expect to approve the purchase of these machines.

The training must therefore be concise, present usable information quickly and also be cost-effective. Throughout the session, the executive will probably be analyzing the costs and benefits of the time spent, determining whether the training is worthwhile or wasteful in terms of executive time, trainer time and machine cost. Executives should leave each training session with an immediate understanding of the benefits to be attained.

Training sessions must be independent. Although we know real learning builds incrementally on previous sessions, executives cannot be depended upon to attend additional sessions. As a result, each session's objective must be clearly defined and the information presented must be independent of other training.

The following techniques have been successful in training executives:

• **One-on-one tutoring:** Many companies use this approach because they think executives expect (and need) individual attention. Given the right tutor for the executive's personality and style, this method can be effective.

Unfortunately, this type of training often turns into a demonstration rather than a hands-on learning experience. As a result, the executive doesn't become proficient or even comfortable with the machine.

• **Independent study packages:** Independent study packages are getting better, but they are limited to a handful of popular software packages or company-specific applications. If these packages are to be part of the training program, executives need only know how to insert the disk and turn on the machine to be able to train at their own pace and convenience.

• **Saturday sessions:** These sessions have proven to be among the most effective methods for training senior executives, who place a different value on their weekend time. The hook here is to invite the executives to bring their children or grandchildren and to gear the presentation to the kids. Introductory material can then be presented without insulting the executives.

The inexpensive games bought especially for the kids are used to get everyone familiar with the keyboard and comfortable with the machine. The executives forget their discomfort and unease when assisting their children. The older children even end up teaching the parents, and the two or four hours become a success for everyone.

• **Use of consultants:** Consultants can be used effectively to overcome superior-subordinate roles that are often obstacles to executive education. The knowledge that an outsider will be doing the training is often enough to encourage the executives and to ensure their attendance at the training sessions. The material can be presented in a nonthreatening manner and each session can be customized to the executive's needs and level.

• **External seminars.** The plethora of seminars geared to executive education is indicative of the widespread use of this approach. Similar to outside consultants, external seminars provide a safe environment for learning. However, they usually require at least a half-day commitment off site, a luxury many executives cannot afford.

The techniques discussed here can also be applied to other areas of executive training, such as the use of decision support systems or the electronic mail system. The important thing is to make sure the benefits are readily apparent to the executive being trained.

OA

Wadness is office automation specialist at Computer Partners, Inc., in Wellesley Hills, Mass.

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75 Other User
Vendors
80 Manufacturer of Computers, Computer-related Systems or Peripherals
85 Computer Service Bureau/Software/Planning/ Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
95 Other Vendor

2. OCCUPATION/FUNCTION (Circle One)
11 President/Owner/Partner/General Manager
12 VP/Assistant VP
13 Treasurer/Controller/Financial Officer
21 Director/Manager/Supervisor DP/MIS Services
22 Director/Manager of Operations/Planning/ Administrative Services
23 Systems Manager/Systems Analyst
31 Manager/Supervisor Programming
32 Programmer/Methods Analyst
35 OA/WP Director/Manager/Supervisor
38 Data Comm Network/Systems Mgmt
41 Engr/Scientific/R&D/Tech Mgmt
51 Mfg Sales Reps/Sales/Marketing Mgmt
60 Consulting Mgmt
70 Medical/Legal/Accounting Mgmt
80 Educator/Journalist/Librarian/Student
90 Other

3. COMPUTER INVOLVEMENT (Circle all that apply)
Types of equipment with which you are personally involved either as user, vendor or consultant
A. Mainframes/Superminis
B. Minicomputers/Small Business Computers
C. Microcomputers/Desktops
D. Communications Systems
E. Office Automation Systems

CW-138

NEWS

Which Way Did They Go?

MELBOURNE, Fla. — Harris Corp. recently found itself in a dilemma. Still in the final stages of development on its Series 9000 office systems offering, the company late last year acquired Lanier Business Products, Inc., the well-known office products manufacturer. Because Lanier had its own successful word processing product, the One-Step software package, and several new products on the way, Harris had to make a quick decision about what to do with the Series 9000.

Clearly, Harris couldn't bring out a product that would compete with Lanier's, so last month, despite more than three years' work and a reported $60 million in development costs, the Series 9000 was gone. According to Jack C. Davis, senior vice-president of Harris' Information Systems Division, the decision was very logical. "We simply didn't want two systems to work against each other."

In fact, the Series 9000 will not disappear completely. Harris announced plans to integrate the "best" features of the 9000 with Lanier's family of products, including the One-Step, the Lanier Business Processor 1000 and the Lanier Business System 5000.

Of the five pieces that made up the 9000 — the 9000 controller; the CRT; the operating system; the text processing software; and Harrisnet, the local-area network hardware and software — only the CRT and the text processing software were officially killed. Harrisnet, Davis said, would be established as a standard for all Harris/Lanier products.

Davis pointed out that the 9000 controller and operating system will form the nucleus of a new distributed data processing system for Harris. The ergonomic design of the 9000 will also be incorporated into other Harris products.

Although consultants agreed Harris had to make this move, the payoff is not so certain. According to Thomas Billadeau, it is doubtful the 9000 ever got into the beta-test stage; therefore, it would be difficult to determine what the "best" features of the 9000 are. "I've used the system and I wouldn't have any idea," he said.

Billadeau added that depending on Lanier for its entrance into office automation was unlikely to succeed for Harris. Lanier has been in turmoil since before the merger, and many of its key managers have left the company. "Harris is going to have to step in and get involved a lot sooner then they had thought. Any end user who commits to Lanier is just begging for trouble." In addition, he said, Harris has also not enhanced its own credibility, because this is the third time it has promised a system and not delivered.

Davis admitted that Harris wouldn't have made certain strategic moves had it known the merger was coming. He said the essential components of the 9000 are not being scrapped, and it was an "excellent opportunity" for a company to be able to choose between two good products (the 9000 and Lanier's System 5000) to offer its customers.

In This Corner . . .

WELLESLEY, Mass. — When Software Arts, Inc. and Visicorp signed a 1979 agreement to market Visicalc, the future for both companies was rosy. Daniel Bricklin and Robert Frankston, creators of the unique and innovative Visicalc, had founded Software Arts and wanted to be responsible for the development and enhancement of the product. They turned to Daniel Fylstra, president of Personal Software, Inc. to handle the marketing of the product.

Needless to say, Visicalc was at the forefront of the personal computer revolution. To date, it is reportedly the best-selling computer program in history.

Unfortunately, this Horatio Alger tale has taken an unhappy turn. With tough competition like Lotus 1-2-3 honing in on its market, Visicalc sales have dipped dramatically — from a high of nearly 40,000 units per month to just 5,700 per month in December. Now the two companies have locked horns in a law suit in which Visicorp sued Software Arts for $60 million in damages and Software Arts countersued.

Visicorp claimed Software Arts was more than a year late in delivering advanced versions of Visicalc and was spending its time developing another product called TK!Solver. Software Arts, in its countersuit, claimed Visicorp had failed to use its best efforts to maximize sales of Visicalc. Software Arts also asserted that it had terminated the agreement, that it is entitled to the return of all Visicalc trademark rights and that it intends to market Visicalc itself.

Last month, Software Arts began to market a $100 advanced version of Visicalc for the IBM PC. Visicorp also continues to sell the product. As usual, the end user gets to figure out what's going on.

Chapter 11, No. 3

SAN JOSE, Calif. — It might be the early signs of the long-awaited shakeout or just poorly managed companies ending up with the expected results. Whatever the reason, Victor Technologies, Inc. in February joined Osborne Computer Corp. and Computer Devices, Inc. as the third micro maker in six months to file Chapter 11 of the U.S Bankruptcy Code.

It was a long way down for Victor, whose president, Charles Peddle, was hoping to make his company the Number Three computer maker in the world by marketing the Victor 9000 desktop. The 9000 was reportedly a best-seller in Europe, but couldn't crack the market at home.

In filing Chapter 11, Victor claimed an estimated $70 million in unsecured debt. Three other units of Victor also filed Chapter 11 — Victor United, Inc.; the U.S. distribution subsidiary; and Victor Technologies International Sales Corp.

As part of the court-supervised restructuring, Victor terminated 300 employees in the U.S., leaving approximately 570 employees worldwide. Victor reached an agreement with its largest secured creditor, Security Pacific National Bank, under which the bank will finance "near-term manufacturing and distribution needs," a Victor spokeswoman said. Victor reportedly has suits pending from several other creditors.

CRT Controversy Continues . . .

Despite the consensus among vendors that CRT terminals are safe to use, the issue is far from settled. Congress and a number of state legislatures are gearing up for debate on CRT health hazards, while studies continue to emerge from many different venues supporting both sides of the issue.

In February, 9 to 5, the National Association of Working Women, released a study implicating CRT use with widespread health effects such as miscarriages, eyestrain, muscle pain and exhaustion. At the same time, The Koffler Group, a consulting group in Santa Monica, Calif., in its published review of CRT health research concluded that all prior research correlating CRT use and adverse health was either poorly conducted or biased.

While six to eight states are considering CRT legislation, the House Education and Labor Subcommittee on Health and Safety heard testimony in late February from a Syracuse, N.Y., insurance company clerical worker who linked her child's birth defects to CRT use. Her company, she said, "enslaved us to the new machinery and subjected us to health and safety hazards." The 9 to 5 study reported that a voluntary survey of 6,000 CRT operators (871 of whom responded) showed more than half experience eyestrain or muscle strain, and 45% reported pregnancies ending in miscarriage, stillbirth, early death of infant or birth defects.

In response to the report, Karen Nussbaum, executive director of 9 to 5, stepped up a national campaign that calls on concerned parties to take action on CRT health and safety issues.

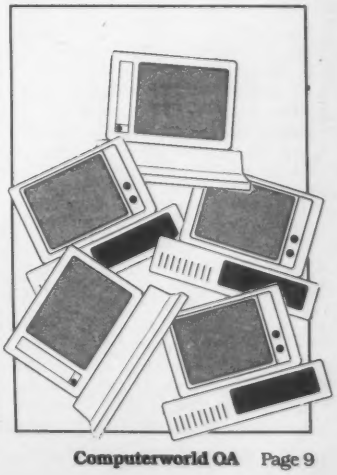
Not everyone agreed with 9 to 5, however. Karen Kessel, editor of the Koffler Group's "Office Systems Ergonomics Report," said any proposed CRT legislation was premature because of the lack of scientific data on the subject. Kessel, referring to much of the negative CRT research, said, "There's a lot of garbage out there." The research Kessel cites as the best in terms of scientific method, concludes that CRTs do not pose a health or safety threat to users.

As solid pieces of research, Kessel referred to a 1981 study by the National Institute for Occupational Safety and Health (Niosh) — which reported no evidence for CRT-caused eye problems — and a 1983 Bell Laboratories report in which no difference was found between the complaints of telephone operators using CRTs and those relying solely on hard copy.

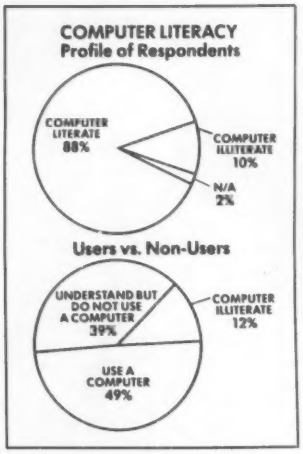
Kessel said publicity about recent reports of CRT health hazards have been unfortunate in that they are diverting attention from "real ergonomic issues." She called for more research on how CRTs are used and better designed software so that tasks are made less monotonous.

Nussbaum said the most important part of her organization's recent study was finding 15 clusters of abnormally high incidences of health problems. She said that instances such as United Airlines' San Francisco reservation desk are being investigated.

"The problem won't be solved by the industry alone," Nussbaum said, and called for legislation to regulate the uses of CRTs "so that worker safety is protected."



NEWS



88% LITERATE

Computer literacy among white-collar office workers is already here and it isn't reserved for the young. According to a study sponsored by Exxon Office Systems Co. (and conducted by the Omni Group, Ltd., a New York consulting firm), 88% of white-collar workers are already computer literate. The study defined computer-literate people as those who either use and understand computers or who have a general understanding of how computers operate and what they can do.

The finding, the report stated, is in sharp contrast to the notion that managers and executives are computer illiterate. Of those polled, 49% use a computer and another 39% have either had "some training or are comfortable with their comprehension of a computer and its applications." The Exxon study also found identical percentages of computer users in the 31-to-40 and 41-to-50 age groups. A majority — 54% — of both groups use computers.

The study said 78% of those who use computers have a daily need for the machine. Among the more widely used OA applications were data base management, word processing, information services, statistical analysis and multiple address mailings.

Perhaps most enlightening was the study's finding that corporate representatives responsible for OA training "significantly underestimated the actual level of computer literacy among office workers and overestimated the degree of fear or other negative factors." The figures showed that representatives thought only 10% of managers knew how to operate a computer when, in fact, 67% of managers said they have this skill. The survey focused on both end users and corporate policy makers. For the end-user survey, 5,000 middle managers were contacted by mail, and 464 reportedly returned questionnaires. The corporate policy survey was conducted by phone with representatives from 100 Fortune 500 service companies. More information is available from Exxon Office Systems, 777 Long Ridge Road, Stamford, Conn. 06902.

PCs And Fortune 1000

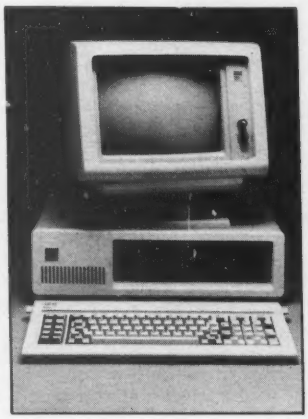
CAMBRIDGE, Mass.— The Professional Automation Report from Forrester Research, Inc., a Cambridge, Mass., consulting and research firm, has taken an in-depth look at the IBM PC and its impact on corporate America — specifically, the Fortune 1000 companies. Forrester has concluded that the IBM PC dominates that market already with an estimated 45% of the installed base. By year-end 1986, it predicted, IBM could have well over two million PCs installed in the Fortune 1000.

Fortune 1000 will lead in professional computer networks, integration with existing mainframe/distributed processing equipment and bridging between different workstation types. In addition, the research firm said this community of users will become primary innovators in the use of next-generation software. The five imperatives that will govern professional computer acquisition in Fortune 1000 industries, according to Forrester, are:

- Compatibility with industry-standard software.
- Concordance with embedded systems.
- Ease of use.
- Organizational support: The professional computer must square with the "corporate information culture."
- Ability to fit with long-term strategy.

The Forrester report divided the professional computer market into three groups: IBM; systems challengers/potentials — Digital Equipment Corp., Hewlett-Packard Co., Wang Laboratories and so on; and stand-alone vendors.

According to the report, IBM will have 2.6 million PCs installed in the 1000 companies by 1988, with AT&T Information Services taking second place, DEC third place and Apple Computer, Inc., fourth. For more information contact Forrester Research, P.O. Box 1091, Cambridge, Mass. 02238.



Videotex Deal . . .

NEW YORK — The entry of IBM into a joint videotex venture with CBS and Sears, Roebuck & Co., may bring instant credibility to the videotex market, but not without some drawbacks, according to industry analysts. Although the deal will not produce tangible results for several years, IBM's entry is expected to exert an immediate influence on videotex producers already in the game.

Martin Lane, a consultant for Link Resources Corp. of New York, expects the videotex market to slow to a crawl until it becomes clear what IBM will do. The wait-and-see attitude may have a negative effect on IBM's major competitors, Knight-Ridder Newspapers and AT&T, whose collaborative venture, Viewtron in South Florida, is the only commercial videotex service in the U.S.

The IBM-Sears-CBS venture intends to send data to home computers instead of the dumb video-screen terminal Viewtron employs. IBM is hoping to cash in on its already widespread base of Personal Computers; Viewtron subscribers must buy AT&T's terminal, which costs $600 and can be used only for videotex.

This agreement marks a change in allegiance for CBS, which had hooked up with AT&T two years ago on a similar project. Sears is hoping to market its vast merchandise catalog and financial services products electronically; IBM hopes to use videotex to sell more home computers.

The videotex business projects tend to be a losing proposition initially, according to Lane. IBM, CBS and Sears have the financial capabilities to survive in the market, he said, but the history of joint ventures between corporate heavyweights does not contain many success stories. Whether the three giants, will succeed in the long haul remains to be seen.

BRIEFS

MAYNARD, Mass. — Digital Equipment Corp. and 3M Co. announced a joint program to develop a new worldwide standard for data interchange in the form of a compact half-inch storage tape cartridge.

Compactape is intended to serve as a secondary storage medium for disk drives in the 20M-byte to 200M-byte capacity range.

For more information, contact DEC, 125 Main St., Maynard, Mass. 01754.

SAN JOSE, Calif. — Visicorp, in a move calculated to expand its position in the windowing environment software market, has lowered the price of the Visi On Applications Manager from $495 to $95. The pricing move was made to "bring the performance and productivity gains offered by the Visi On to a broader base of end users," Visicorp said from 2895 Zanker Road, San Jose, Calif.

OMAHA, Neb. — A comprehensive directory of all 22,368 U.S. computer dealers is now available from American Business Directories, Inc. The spiral-bound book fits into a briefcase and is available for $369, from American Business Directories, Inc., 5639 S. 86th Circle, P.O. Box 27347, Omaha, Neb., 68127.

MENLO PARK, Calif. — The personal computer market for business establishments will peak during the next two years and then grow at a far slower rate than previously expected, according to a study by SRI International, Inc.

SRI also estimated that average annual growth from 1986-1990 will be only 5.4% and that by 1986, more than half the personal computer shipments to U.S. businesses will be replacements for older 8-bit and 16-bit gear.

The findings are part of a $400,000 research program on office automation applications done by SRI.

The entire study is available for $24,000 from SRI International, 333 Ravenswood Ave., Menlo Park, Calif., 94025.

TROY, Mich. — The American secretary loves office automation.

That was the finding of a recent survey, "People in the Electronic Office," which looked at the impact of OA on people in the office. The Kelly Services report indicated that 93% of secretaries surveyed are not only satisfied with being secretaries, but are also satisfied with their current positions.

Word processors and other electronic equipment are seen by 87% as opening up new opportunities for advancement.

The report is available at no charge from Kelly Services, 999 W. Big Beaver Road, Troy, Mich. 48084. OA

It Takes All Kinds...

BUT NOT ALL MANAGERS' STYLES ARE EQUALLY EFFECTIVE.

BY ROBERT L. WILLIAMS

Success is measured in many ways in today's world of business. Nevertheless, most office automation managers would agree that having solid support from top management, along with adequate staff and budget to allow the development and execution of aggressive plans, would constitute a strong start. This article examines some attributes that help a manager achieve these ends.

Any discussion of OA implementation typically involves several topics:

Technology, of course, leads the pack and probably always will; other factors like user training, cost-benefit analysis and start-up strategies also often enjoy the spotlight.

However, the issue of assuming the appropriate management style is usually kept relatively obscure — even though it, perhaps more than any other issue, determines the ultimate success in establishing and expanding OA in the organization.

Many OA managers encounter two kinds of delays while implementing their programs. The first is the basic failure of top management to understand and be committed to OA as a means to achieve business objectives. The second involves day-to-day operational

(Continued on Page 13)

THE MUSEUM OF MODERN ART/FILM STILLS ARCHIVE

Roadblocks to OA Implementation

Roadblocks to OA implementation occur in two significant areas: lack of commitment from top management and day-to-day operational difficulties. The manager who can recognize the issues involved in these two areas and who can respond to their challenges will find his job a lot easier.

Three common symptoms identify an inadequate commitment to OA by top management:

☐ No formal charter exists. There are no clear definitions of the goals and responsibilities of the OA resource group or its relationship with the DP and telecommunications functional areas. The latter point is particularly crucial because OA, DP and telecommunications together comprise the backbone of the information network; various degrees of paralysis result when their efforts do not completely complement each other.

☐ OA staffing decisions are inadequate. The assignment of personnel to the OA area is often opportunistic, if not haphazard. This tends to compromise both the size and talent of the OA resource group. As a result, the manager is spread too thin and cannot effectively apply his skills.

☐ Perceptions of cost-benefit are distorted. Many well-conceived OA programs are based upon intangible or soft-dollar savings. (Hard-dollar savings can be identified only when significant amounts are presently being spent on office support systems and services.) If key decision makers are reluctant to move forward without tangible cost-justification, exceptional opportunities may be lost.

The second reason for slow progress, day-to-day operational difficulties, has six distinct challenges associated with it:

• ***Obtaining cooperation from the user community.*** Without the proper input and support from the people being affected by OA, no recommendation has a chance.

• ***Projecting realistic benefits.*** With no standard method available, the most appropriate approach to justification is often unknown.

• ***Selling the concept of OA.*** The acceptance of proposed solutions depends largely on how the message is delivered. This is apparently more difficult for managers who come from a technical rather than a functional background.

• ***Establishing organizationwide policies.*** Due to the divergence of viewpoints and the frequent development of expertise within user groups, many OA managers are frustrated with their track records in setting uniform guidelines for the acquisition and use of OA systems.

• ***Dealing with vendors.*** Many OA managers feel that a great deal of pressure is exerted on them to observe preferences for certain vendors. This obviously is a delicate issue and requires continuous attention. The inability to stay abreast of developments in the rapidly changing marketplace is another source of deep concern.

• ***Dealing with change.*** Perhaps the most common on-going challenge is finding time to monitor and react to continually evolving technology, organization and reporting relationships as well as to changing user needs and expectations. The OA manager must frequently negotiate with new users on everything from revised job descriptions to hardware configurations. OA

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(Continued from Page 11)
difficulty (see "Roadblocks to OA," Page 12).

The technologist is a Thinker, concerned with OA hardware and software and the combination that will produce the ideal system. This quest typically ignores specific needs and desires of users.

Roles available to the OA manager who seeks to overcome these roadblocks to success generally fall into one of four categories, which are are plotted on the Professional Personality Map shown in Figure 1 on Page 14.

The two dimensions represent motivating needs. The first is the need for control of the environment; the second, the need for interaction with people. Any pair of coordinates on the grid formed by the two axes falls into one of four quadrants, each of which represents a unique professional personality:

☐ ***The Doer*** has a high need for control of the environment and a low need for interaction with people. This person wants something to happen and wants it to occur according to his plans. However, the Doer is not overly concerned with whether other people are sold on the project.

☐ ***The Thinker*** has a low need for control of the environment and a low need for interaction with people. This person is satisfied with personal knowledge and preoccupied with designing the ideal system. The fact that no one appreciates the system and that it does not come to life puzzles the Thinker.

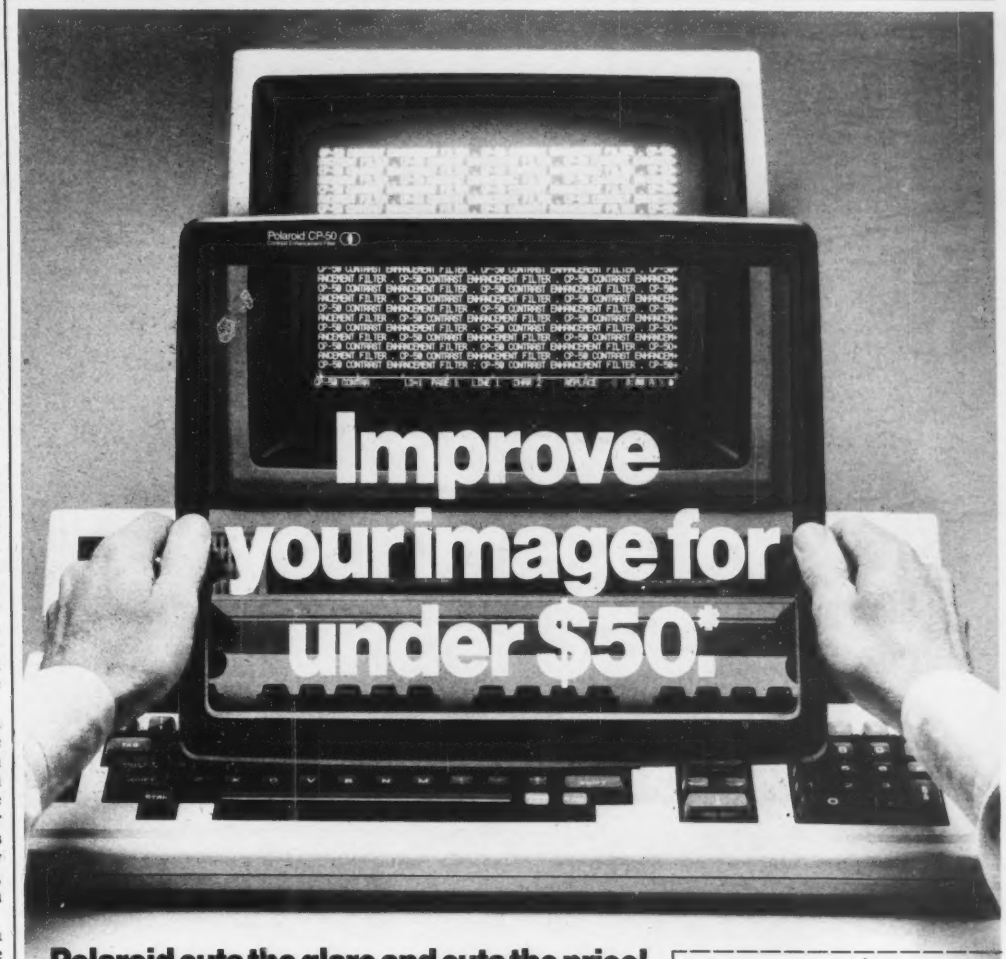
☐ ***The Adviser,*** with a low need for control of the environment and a high need for interaction with people, is rather passive and enjoys being asked for help. This person places great emphasis on how well his work is perceived, but very little emphasis on actual results.

☐ ***The Promoter*** has a high need for control of the environment and also has a high need for interaction with people. The Promoter actively seeks out new opportunities and is satisfied only when his ideas receive favorable acceptance and are fully implemented. This person devotes great effort to addressing all aspects of a project to ensure its success.

Every OA manager fits into one of the categories of the Professional Personality Map. More specific labels may be used to describe each role in the context of OA. The empiricist is a Doer. He likes the experimental approach, installing pilot project after pilot project and slowly growing a sophisticated and well-tested automation capability for the organization. The result is a slow but steady growth in the use of OA.

The technologist is a Thinker. This person is concerned with OA hardware and software and the combination that will produce the ideal system. This quest typically ignores specific needs and desires of prospective users. The result is certain frustration, disappointment and resentment.

The consultant is an Adviser. Line managers are served only when they request assistance. The analysis is usually on tar-



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COA 4/11/84

get, but serious inconsistencies develop during the installation process. The result is slow progress toward automation and difficulty in getting departments to become standardized.

The entrepreneur is a Promoter. This person takes a marketing approach to the problem of spreading OA throughout the organization. He concentrates on actual user requirements while also focusing on the applications that promise the best return to the organization. The result is rapid movement and the maximum possible results from the resources allocated to OA.

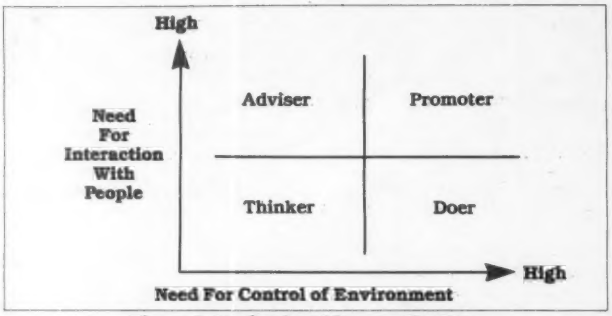

Figure 1. Professional Personality Map

The role of entrepreneur best positions the OA manager to remove those obstacles to success (described in "Roadblocks to OA Implementation" on Page 12) by recognizing the importance of people and their needs, as well as the organization's requirement for optimal cost-performance.

An entrepreneurial OA manager style has some key advantages.

First, it sells the concept of OA. Many people are still resistant to automation and have difficulty understanding how it can help them. The entrepreneurial OA manager puts substantial energy into educating top management and potential users, identifying underlying concerns and meeting objections with persuasive arguments and favorable facts.

Second, it facilitates organizationwide standards. The entrepreneurial OA manager takes an active role in promoting systems. This provides an excellent opportunity for large-scale planning and for installing compatible systems and procedures wherever automation goes.

The third key advantage of the entrepreneurial style is that it fosters innovative, results-oriented attitudes. An entrepreneurial OA manager will push his program forward at a good speed while keeping everything aligned with underlying business purposes.

Most OA managers would like to have top management's solid support and an adequate staff and budget to allow the development and execution of aggressive plans. The OA manager who wants to achieve that enviable position should demonstrate that the following descriptive statements apply to him:

- Able to handle conflict.
- Not afraid to make decisions.
- Cannot wait for the perfect solution.
- Sensitive to the human factor.
- Accepts limitations.
- Surfaces needs and develops practical transition strategies to meet them.
- Solves business problems.
- Develops trust and confidence.
- Stresses teamwork.
- Understands the change process.
- Attracts and retains competent staff.
- Knows when not to get involved.
- Expands knowledge of technology through effective delegation and vendor relationships.

Each of these attributes is associated with the entrepreneurial style. Given the typical roadblocks to success, they underscore the need to let that style pervade every aspect of the job. When this is done, the OA manager can feel sure he is contributing as much as possible to improve information management, enhance productivity and contain office support costs within the organization. OA

Williams is a manager in the Philadelphia office of Arthur Andersen & Co. and a member of the firm's core group of OA consultants.

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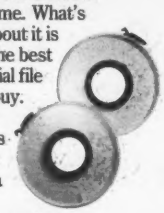

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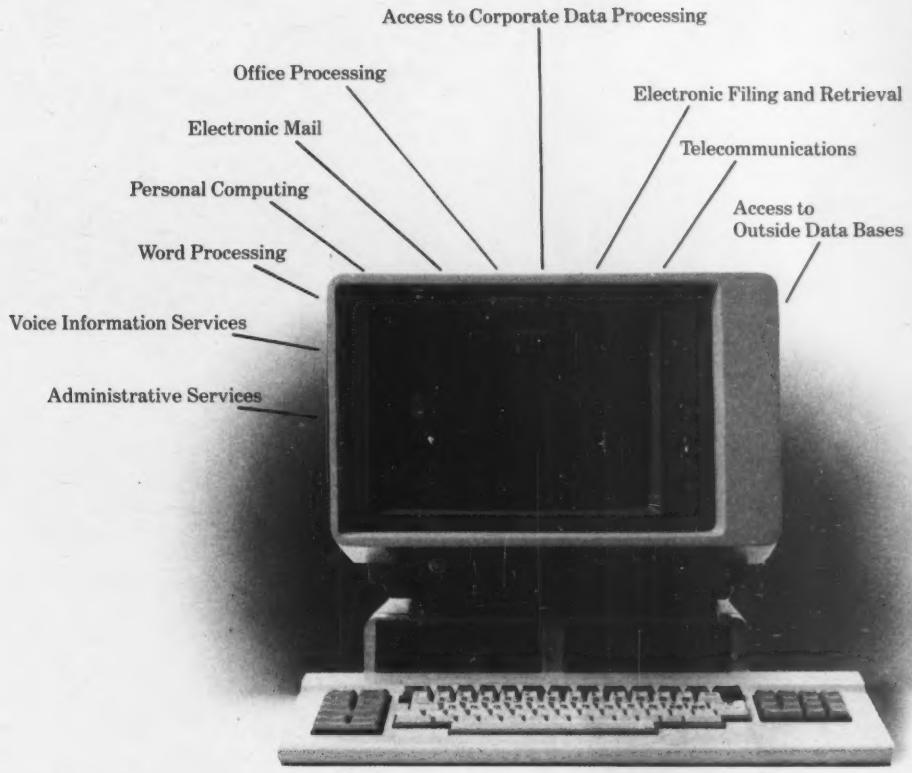

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Windows Come To The Workstation

By Molly Upton

A mad rush toward modeless, multipurpose software for personal computers is now under way. When the dust settles, the real winners will be users who don't want to switch floppies constantly or dicker with operating system commands and different structures for different applications.

In the meantime, those making major buying decisions about software packages face a difficult process. A look at specific features follows; first, let's look at some global level trends — including windows and integrated packages. Everyone aspiring to be anyone in the packaged software business is touting an integrated system. "Integrated software" means a lot of things to a lot of people, but three hierarchical levels seem to stand out. In general, each level contains the characteristics of the previous levels:

• Data integration — data from one application can be transferred to another application.

• Command structure — the majority of the commands are constant throughout the range of applications.

• Modeless (or seamless) — functions previously done under different applications can be performed in one application. Integration of data and command structure are achieved as well. A central data base, from which all applications are structured, is generally required.

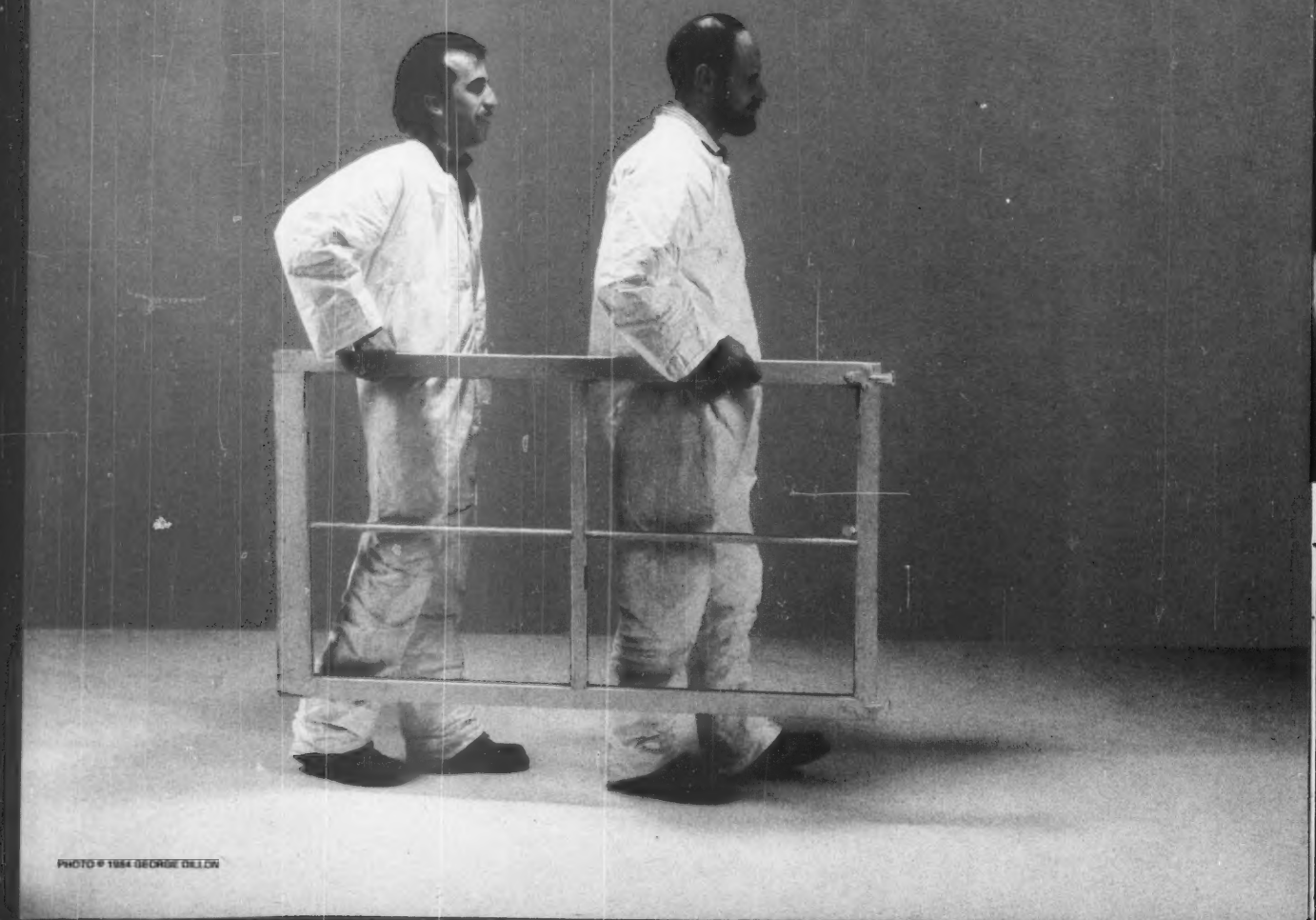
Environment software, which is divided into two types, provides hooks between the operating system below it and the applications software above it. The first type — Visi On, for example — requires new software to be written to its specifications; the second type — Quarterdeck's Desq falls into this category — accommodates existing software.

Multitasking or concurrency is one important trend which, although not yet pervasive, probably soon will be as the demand for background communications increases. Another strong trend is toward hot switches, as they are sometimes called, which make it easy for the user to suspend operations in one task, implement another and return to where he left off. Quarterdeck's Desq, Digital Research's Concurrent CP/M and Structured Systems Group's Windowmaster seem to be the principal providers of multitasking environments.

One word of caution must be raised about concurrent systems: Some of them seem to have a difficult time handling communications as an uninterrupted background task. Ouch!

Digital Research has indicated it will announce a product that lets MS-DOS run on top of Concurrent CP/M. Whoever thought the battle of the operating systems was over?

Open systems is really quite a



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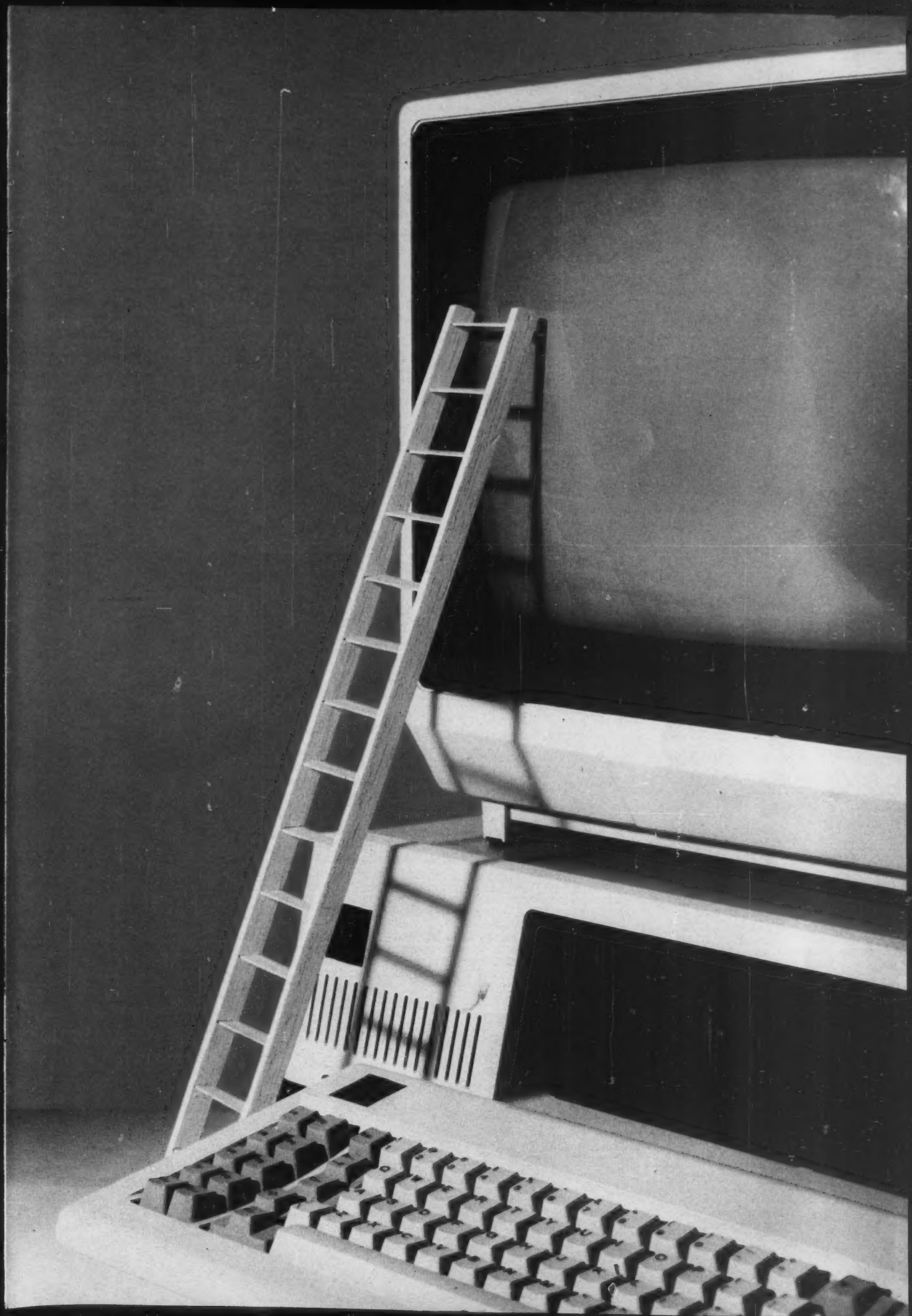

loose term. According to one meaning, it is an integrated package that accepts other packages' files (also known as import/export capability) via such means as the DIF format.

DIF is a file format standard, developed by Software Arts, to enable the transfer of data. All DIF files have two basic parts, one of which contains information about the file, the other the data itself.

In another meaning of open systems, the vendor of the environment — Visicorp, for example — makes available its specifications to other vendors to write programs that use the same user interface and also integrate data.

Artificial intelligence work being done in the Lisp language can be expected to be applied to mundane applications. The user will simply see easier to use applications that appear to function more or less the way he thinks they should.

Intuitive systems are also creating a lot of discussion. Artificial intelligence work being done in the Lisp language can be expected to be applied to mundane applications. The user will simply see easier to use applications that appear to function more or less the way he thinks they should.

Goal seeking or the how-to-get (as well as what-if) spreadsheet is a feature being implemented

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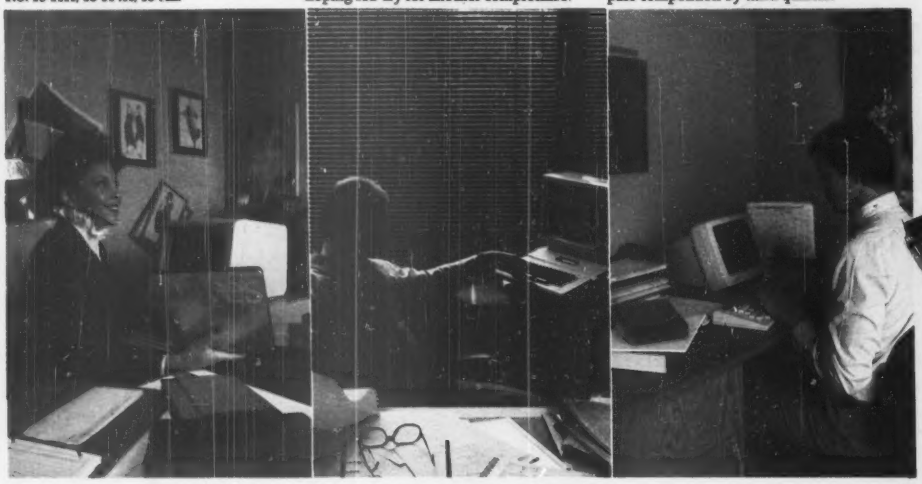
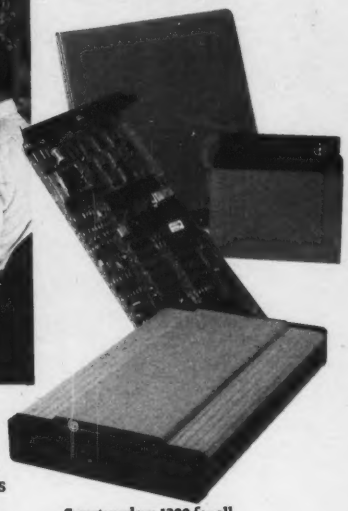


Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.



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High Speed Data Format: (Smartmodem 1200) Serial, binary, asynchronous: 7 data bits: 1 or 2 stop bits; odd, even, or fixed parity or 8 data bits: 1 or 2 stop bits: no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands: (unnecessary with Smartcom II software) A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Set" commands speed, escape code character, number of rings to answer on, etc. S?: Checks operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes: (can be numerical/verbal): 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rate: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z8™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: -9 to -50dBm for Smartmodem 1200; -45dBm for Smartmodem 300.
Transmit Level: -10dBm.
Registration: FCC registered for direct-connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ11C, RJ12W, RJ12C, RJ13W, RJ13C.
Power Pack: U.L. listed 120VAC, 60Hz, 13.5VAC output.
Size: 1.5" × 5.5" × 9.6"

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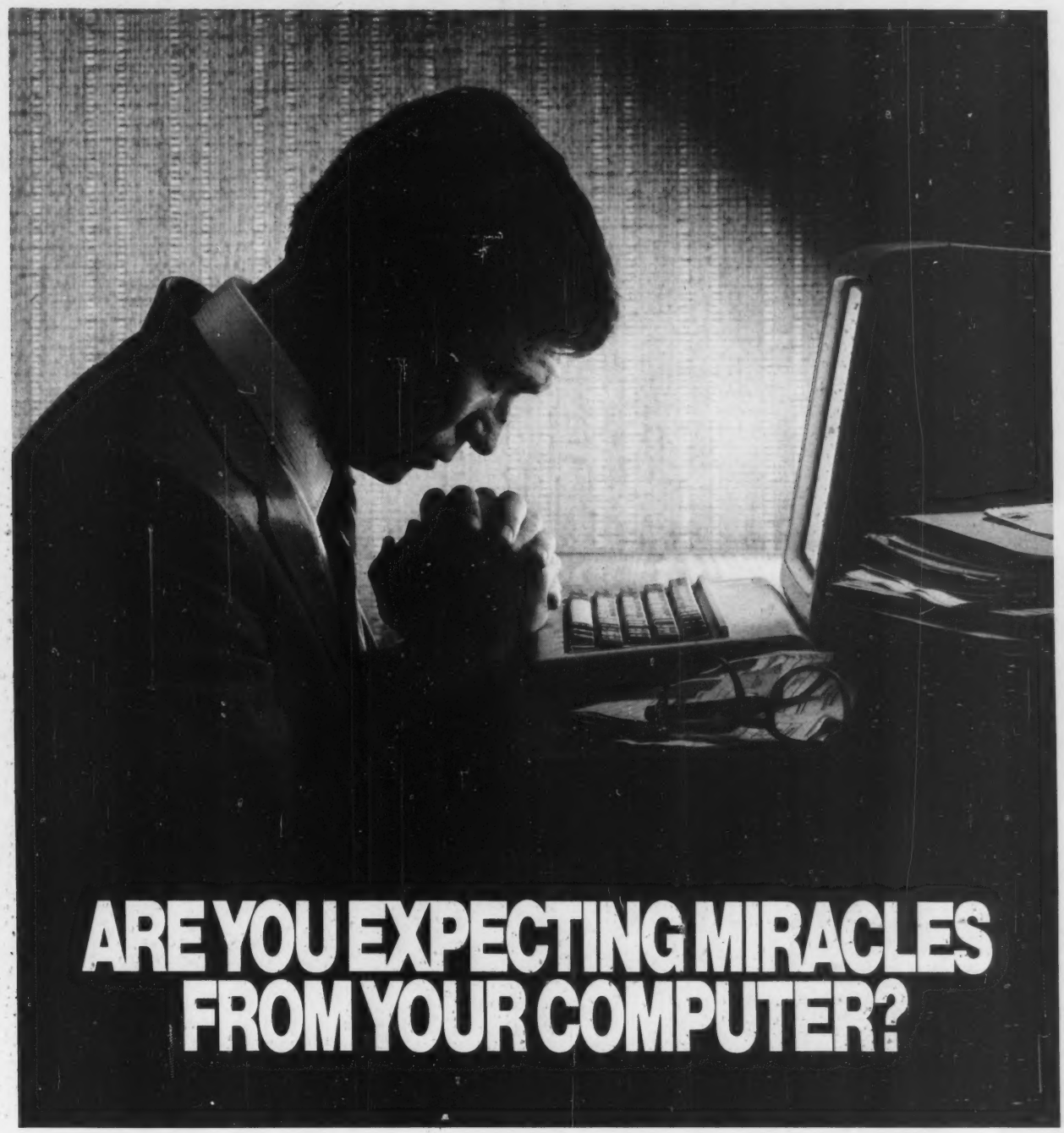

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WINDOWS

Windowing is an extension of the operating system. With windowing, levels of capabilities differ according to vendor. Windowing may occur within an application, such as word processing, or among different applications. It may be single tasking, with one application actually running, or multitasking, with more than one application functioning simultaneously.

Some packages, like Microsoft Corp.'s Windows, offer the windowing capability alone; others, like Quarterdeck Software's Desq, use windowing as a vehicle for other capabilities — in this case, data integration.

Windowing packages can be categorized according to two types of windows. In either case, the user selects the size of the window and calls up another application. Microsoft's Windows uses tiling, the approach used by Xerox Parc's Bravo editor. The software keeps the user's screen neat. In the second approach, windows overlap, as in Xerox Corp.'s Star, Visicorp's Visi On and Apple Computer, Inc.'s Macintosh.

In light of the trend toward modeless software, windowing is neither the last word nor a required facility for all software. However, it will always be necessary to look at two sources of text simultaneously, especially within an application such as WP, and this is best done with windows. Windows will be needed in systems that switch easily between local and remote programs.

Windows may not be necessary in the many cases where the sole function of windows is to help a user transfer data from one application to another in order to perform a different function — for example, spreadsheet data into a graph, or a graph into WP. With a modeless package, a user can start out in WP, do some spreadsheet work in the document and graph it without leaving the original document.

In an attempt to describe differences between his firm's environment software and other vendors' (read Microsoft) windowing managers, Dan Fylstra, Visicorp's chairman, maintained the following: Windows in and of themselves are not a panacea. They are a good vehicle for building better applications, but have little virtue in and of themselves. They do not automatically solve integration problems or make an application easier to use, he said.

Nevertheless, a number of windowing packages were announced recently and the rumor mill reports that IBM is expected to announce its own window manager shortly. If true, that could explain why Microsoft failed to sign up IBM as an OEM for its window manager. Such an IBM package is expected to be the advance guard of a move to make PC-DOS more proprietary — just when lots of vendors thought there was a market for MS-DOS hardware.

	VISI ON	MICROSOFT WINDOWS
HARDWARE	Hard disk 294K memory Bit-mapped screen Mouse graphics support	Two floppies 192K Bit-mapped screen Mouse graphics support
TYPE WINDOWS	Overlapping	Tiled
RUNS ON	XT, TT, Wang Compaq Plus Honeywell 6/10	23 Vendors, including Wang, TI, Compaq, HP, DG, DEC
CHANNELS	Retail and DEM	DEM only
AVAILABLE	Soon	2nd quarter '84
DEVELOPMENT SYSTEMS	VAX, 68000	Micro with MS-DOS

Figure 1. Comparison of Visi On and MS Windows

on newer packages. With goal seeking, a user inserts parameters — such as revenue over six months — and the program gives an example of the numbers needed to arrive at the target. Software Products International plans to ship this feature as part of its Open Access.

Linking can be either optional or fixed, depending on the package. With some integrated packages, the user has no choice: Figures in the spreadsheet are linked with the graph and so on. Some folks want a choice — Software Products International's Open Access, Ovation Technology's Ovation and Visicorp's Visi On offer it.

Macro capability, which is also known as stored user instructions, is similar in concept to the stored keystroke command facility on WP gear. It ranges in sophis-

tication from capturing steps to do a function within one application to programming the interaction of a number of applications. As Macros become easier to do, the user will not be aware he is programming.

In the investigation of integrated packages and environments, one key question users should ask is whether the product accommodates the transfer of existing data files into its applications (see Figure 2 on Page 22).

Visi On from Visicorp and ***Windows*** from Microsoft are both examples of software being written today for the hardware of tomorrow. Both companies like to demonstrate their products on Wang's Professional Computer because it has an 8086 instead of an 8088, and they are eagerly awaiting the widespread availability of the speedier Intel 186 and 286 processors.

Both products also offer applications developers an environment that will provide portability of software to other hardware running the same environment. In addition, Visicorp provides applications for its system; Microsoft does not. (See Figure 1.)

The interfaces are quite different. The Visi On screen features overlapping windows; across the bottom of the screen is a common list of commands including Help, Open, Close, Full, Frame, Options, Transfer and Stop. In addition, each application's window also carries its own line of its commands.

Unfortunately, when a window occupies less than a whole screen, all the commands are not visible and must be scrolled horizontally via the mouse. As they pass, they are highlighted in reverse (white on black), which is a bit strong visually. Pull-down windows, if not also icons, might provide a cleaner interface, and the screen is not as clean as that of a Lisa or Mac.

A relatively little-known fact about the first release of Visi On is that it does not allow transfer of graphs into a document. Also, Visicorp, which is offering applications to go with its Visi On environment, gets 10 lashes: Although it is now putting the DIF file transfer into Visi On, that wasn't originally among the specs.

That from a company that pioneered what has become a de facto standard!

The Visi On system shown in November had a few tender spots, which may have been cleaned up by now. Among its OEMs Visicorp has signed IBM, which will market Visi On and its applications under Visicorp's name.

Microsoft Windows is described as an extension to MS-DOS 2.0. It provides a window manager and graphics device interface and thus offers applications developers a virtual interface to bit-mapped screens and the use of a mouse. In addition, the package offers window capabilities, data exchange and user interface features, such as menus, icons and scroll bars.

Data transfer is done if participating programs find a common format and agree on a protocol. Initial data types include uninterpreted binary, Ascii text and Sylk files. Any MS-DOS application that doesn't address specific hardware will run, appearing through the windows. Other software that goes to the hardware level also runs, but without benefit of any capabilities of windows.

Applications available for Visi On include, in addition to the Visi On applications manager (environment), Visi On Calc, Visi On Word and Visi On Graph. Visi On Query, a relational data base manager, will be available in the first quarter. Current files from existing Visicorp applications can be transferred into the Visi On environment, and there is a full trade-in financial incentive to upgrade to the new applications.

About a month after shipping the product, Visicorp dropped the price of the applications manager from $495 to $95. Perhaps users can understand paying for applications, but think the ability to trade information among applications should not cost so much. Visicorp insists that the move was preplanned and that it intends to use this timeframe for aggressive penetration of the market before MS Windows hits the streets.

Visi On Graph costs $250 for line, pie, bar and area charts; Visi On Word is $375 and shows underlining, bold, italics, subscripts and justification and Visi On Query tables hold up to 65,000 records and can join up to five files. The interface to the data base is meant to resemble a spreadsheet and will sell for $375. Visi On Calc costs $395, and the mouse is priced at $250.

Visicorp doesn't really intend to be in the mouse business, and it is providing the RS-232 mouse

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Min Memory(K)	128	256	256	256	128	320	256
Disks	2 flop.	2 flop.	hard	2 flop.	2 flop.	1 flop.	2 flop.
Modeless	X	X	X				
Windows				X	X	X	X
Applications							
WP	X	X	X	X	X		X
Spread	X	X		X	X	X	X
Graphics	X	X		X	X	X	X
DBMS	X	X	X	X	X	X	X
Commo.		X		X			X
Time Mgt.				X			
Project Sched.							
Mouse			No	Opt.	Opt.	No	
Auto. Linking	X	Possible	Possible				
Macro		X	X	X	X	X	X
Import/Export	DIF	DIF/ Ascii	text format	SIF	DIF/ Ascii	DIF/ Ascii	DIF/ Ascii
Virtual Memory		X		X			X
Available	Jan	1st Q	Feb	Jan	Feb	3rdQ	1st Q

Figure 2. Integrated Software Packages on IBM PC Chart © 1984 IDC

specifications to the peripheral industry. For output, the firm said it is working on a virtual device standard which will be printer independent with the addition of device drivers. It is shipping a library of 11 device drivers and has plans for more.

Visicorp has reported a backlog of about 30,000 Visi On products. The company has shipped over 1 million Visicorp products, with Visicalc accounting for more than 700,000 of these.

Desq from Quarterdeck, in contrast with Visi On and Windows, is a package for today's applications. Desq provides a portable computer user with an environment that allows files to be swapped from one application to another, stores user instructions, has a hot switch between applications and uses a mouse.

Desq does not offer common commands on the application level and thus is best for users addicted to various programs. The recommended memory is 512K bytes and a hard disk. Desq, like Microsoft's Windows, will accept Lotus files. The price is $399 for the multiple window product. Quarterdeck has signed contracts with NCR to market Desq on its Decisionmate and with Digital Equipment Corp. on its Rainbow.

Bill Gates, chairman of Microsoft, and Gary Pope, Quarterdeck's executive vice-president of software development took part in a happenstance thrust and parry session in the aisle at a recent conference. Gates seemed impressed and according to the rumor mill, he may be thinking of doing something in conjunction with Quarterdeck.

Lotus' 1-2-3 is probably the most popular integrated package, and ***Lotus ' Symphony*** package adds WP, communications and a beefed-up data base with forms and mail merge capabilities to the Lotus 1-2-3 features of business graphics and spreadsheet. Windows can be either tiled or overlapping, and there is a facility to exit to MS-DOS and then return to the same spot in Symphony. Lotus claims Symphony will support MS Windows and Desq and the 3270 PC environments and is thus able to swap information between Symphony and programs running under these environments. Symphony will be available in mid-1984 for $695.

Open Access from Software Products International (SPI) is a good example of an integrated package with common commands, and it may be a winner. The folks at SPI come from the University California San Diego (also embryo for UCSD Pascal), and SPI has been licensing software to manufacturers since 1979. Open Access is very quick and includes nice features like three-dimension graphics, multiple graphics on the screen simultaneously, goal seeking or how-to-get spreadsheet and optional linking.

All six modules can stand alone or be integrated. For example, the relational DBMS can join five files simultaneously; retrieve records based on 64 search conditions and then sort on 15 fields; and perform mail merge, among other tasks. The spreadsheet has virtual memory. In addition to the graphics, mentioned above, its other features are WP, communications and time management.

Handy pop-up special function windows such as help, search (list of files) and pocket calculator are easily invoked. The entire package, which costs $595 from SPI, San Diego, Calif., can run on either floppies or a hard-disk IBM PC system. It accepts DIF files and also Lotus files.

Other integrated packages exist in varying stages, but before buying them, users should ask the following questions:

- Is the level of function sufficient in the applications you plan to use? Many are not strong in one area or lack it altogether.
- Can you transfer your old files into it?
- Are the commands as well as the data integrated?
- If you need to use this package in conjunction with a mainframe, will that be possible?

Upton is editor of the "Office Automation Reporting Service" newsletter published by International Data Corp. (IDC), an information processing market research firm in Framingham, Mass. OA

MODELESS PACKAGES

Integrated packages aren't the last word. Modeless packages actually seem to be arriving.

Jack 2 from Business Solutions, Inc. of Kings Park, N.Y., runs on a 128K-byte IBM PC (or look-alike) with two floppies or an IBM XT with a supplemental installation package. It features automatic linking among four applications: WP, spreadsheet, data base manager and business graphics. All functions can be done on the same screen, which means a user doesn't need to exit from WP to do spreadsheet calculations and so on.

Jack 2 word processing can handle multiple columns of text on the same page and hide scratchpad or confidential information in the middle of the text. In the spreadsheet, users can call the cells by name. Currently, because it was designed to be printed by daisy wheel printers, the graph function is limited to bar charts. Icon-driven commands are displayed at the top of the screen. The price is $495.

Other packages include a report generator, at $250, which can calculate and count, and Utility, at $125, which transfers files between Jack 2, DIF and PC-DOS files.

Dayflo is another offering and comes from Dayflo, Inc. of Irvine, Calif. Dayflo runs on a hard-disk IBM (or look-alike) and performs functions such as WP and data base management. It is reportedly designed to work the way a manager does and accommodates "impulsive input" filing and retrieving information in a variety of ways. Future plans call for graphics, spreadsheet, project manager and other applications. Its price is $495.

Ovation from Ovation Technologies of Canton, Mass., is one of the first products touting a wide range of application functions performed within a universal environment. The company claims Ovation eliminates data swapping. It looks modeless to the user, who can perform spreadsheet functions and graphs while looking at his text screen. The package uses 30 common commands throughout all functions; new users should find it easier to get up and running than almost anything else on the market.

The proof of the pudding lies in the range of functionality within the five applications: WP, spreadsheet, graphics, information management and communications. Log graphs are reportedly possible, which may make this a first on multifunction system.

Ovation claims the system recognizes the form of data it is working on and acts appropriately. A macro capability exists, and the program also uses virtual memory. Ovation will be marketed with Tandy's newest product and seems to run very fast on an ordinary PC XT.

Ovation needs 256K bytes of memory and DOS 2.0 on either floppies or hard disk, but the latter is strongly recommended. The price is $795.

Aura from Softrend is yet another entry in the modeless arena. Based on menus, the package does include command bypass facilities, and its strong point is its macro instructions. A user can create his own main and sub menus and can also store instructions within an application to perform such tasks as select, sort and create a report. Aura looks as though it would be handy for the person who has to do repetitive tasks on different data.

Although Aura does not have goal seeking, it does zoom from a spreadsheet back to the source of a particular number. Its elements include information management, spreadsheet, business graphics and WP. The business graphics involves switching to bit-mapped mode and comes with prestored boxes, circles and so on. In addition, text can be different sizes.

Aura is priced at $495 from Softrend in Salem, N.H.

Whatever Happened To Xerox?

By Glenn Rifkin

It could simply be a matter of perception. Xerox Corp. views itself as a strong contender in the integrated office marketplace, but industry analysts are scratching their heads and wondering whether the giant corporation intends to stay in the business at all.

It could also be a case of great expectations. Yes, Xerox has a strong office presence with its copier/duplicators, laser printers and electronic typewriters. But why hasn't Xerox — the nation's 38th largest corporation, with $8.5 billion in revenues, more than 100,000 employees and a name so engrained in the office that it has become a verb (as in "to photocopy") — managed to parley that power into becoming a dominant force in OA?

Three years ago, Xerox seemed poised to do just that. With its Ethernet local-area network as the first solid contender available in that market, the company made a flurry of announcements in 1981 for add-ons to the network, including its innovative 8010 Star workstation; the 820 personal computer; the Memorywriter family of electronic typewriters and a series of enhancements to Ethernet. The company also offered its 860 word processor for the network.

The Xerox strategy was to offer an integrated office solution based

on the Ethernet network, with the Star as the flagship product.

With its user-friendly mouse interface, icons, powerful integrated software, windows and high-resolution screen, the Star was the talk of the industry that year. Unfortunately, the talk didn't translate into dollars. With a $16,000 price tag, the Star faded quickly.

Since then, Xerox' quest for the office market has been quiet and unspectacular, to say the least. More than 5,000 Ethernet networks are installed and the specifications have been adopted as standards by the IEEE and in Europe. But of those 5,000 Ethernets, only 500 were installed by Xerox. The company made public its specifications when the product was introduced and many other vendors are selling Ethernet-like products. As Tom Elliott of the International Data Corp. (IDC) put it, "Reflected glory doesn't necessarily do anything for the bottom line."

The company hasn't introduced any innovative technology since 1981 (except enhancements to existing products). Although Xerox officials have expressed commitment to a strong personal computer offering for its customers, Robert Adams, president of Xerox Systems Group, admitted that no new product in that arena would be introduced in 1984.

Xerox has also seen several of its key office division leaders leave the company. It has reorganized the structure of these divisions several times in the last few years, culminating in the formation of the Xerox Systems Group under Adams in June 1983. Adams is now responsible for the three divisions, Printing Systems, Office Systems and Office Products, and for the Versatec and Kurzweil groups, two acquisitions which supply electrostatic plotters and data entry systems respectively.

Despite the apparent loss of momentum over the past three years, Xerox is sticking to its guns and its strategy. David T. Kearns, the company's president and chief executive officer, said, "We are committed to office automation. We have a broad line of products. We are doing well in some areas and not as well as we'd like in others. But we're proceeding."

Kearns pointed out that Xerox has been a pioneer with both Ethernet and the Star. He admitted that in 1981 "we may have made more of a flurry [of announcements] than we should have. We have not met the expectations of the numbers of installations we would have liked if you look at the objectives we had at the time. But we have a large number of networks installed worldwide of which we're very proud. They are with sophisticated users who know and understand systems and feel we are providing them with good service.

The Ethernet specifications have been adopted as standards by the IEEE and in Europe. But of the 5,000 Ethernets in place, Xerox installed only 500.

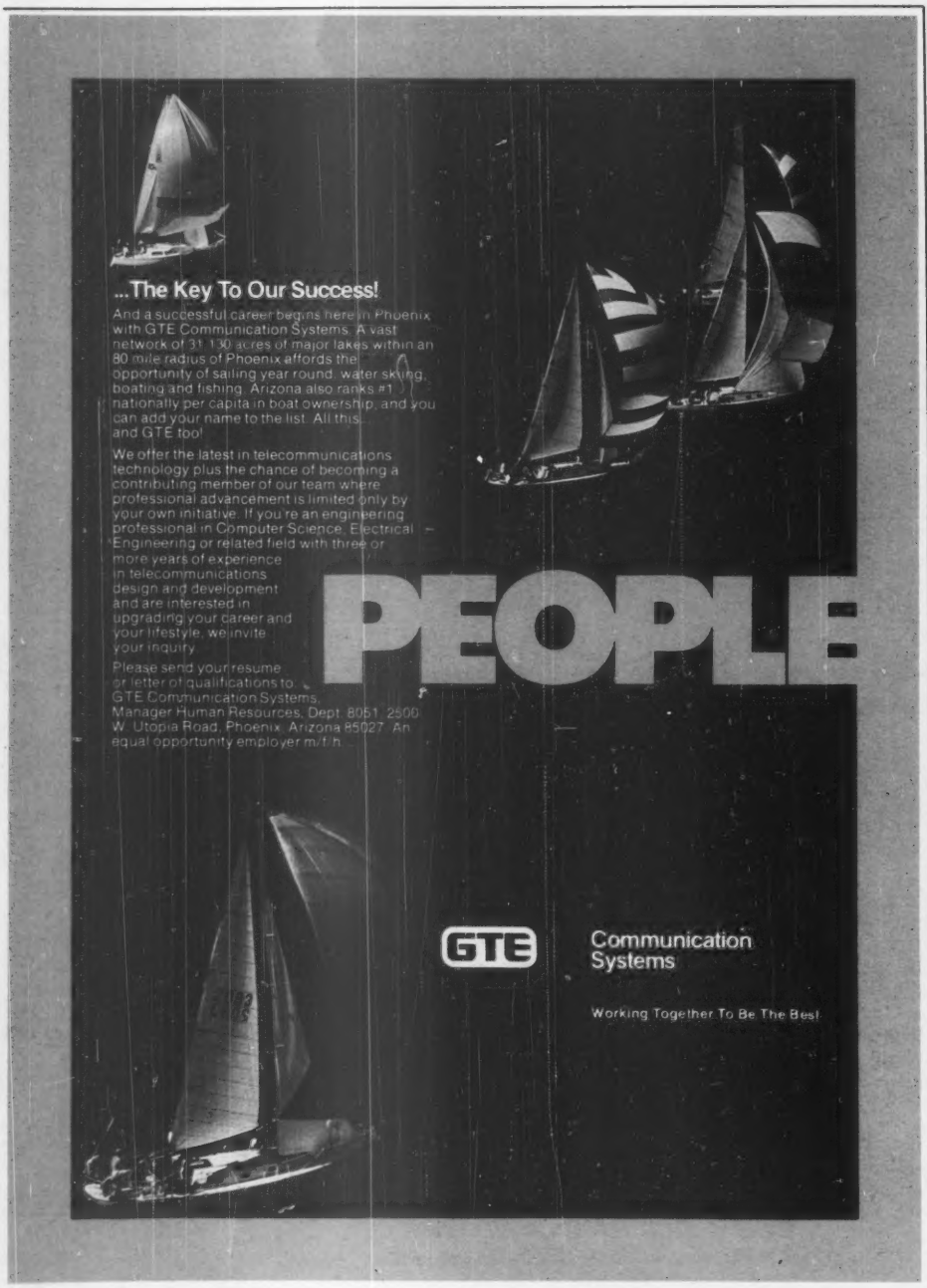
I wish we had twice as many as we currently have, but we're on the uptake in that area."

John Shoch, president of the Office Systems Division, believes that much of the negative attention Xerox has been getting lately can be credited to "people in the industry who help to perpetuate an incorrect impression based on old information."

Since 1981 the company has tended to take a "lower profile" as it built away at its system, according to Shoch, who said some Xerox customers are getting up to 500% improvement in productivity with these systems. "What we've been doing since the announcements is delivering the goods. When we work with a customer, we're trying to understand their complete work flow and have an office systems solution that has dramatic improvement in the way they run their business. We now have about 20 products on the workstation and server side, and a bunch more coming. We have pulled together more products working to solve office systems problems than anybody else in the business," he said.

Industry analysts, however, don't share Shoch's enthusiasm. Elliot of IDC pointed out that in 1983 Xerox had "an unusually nondescript year. It does not seem to be nearly the force to be reckoned with that it did even 18 months ago."

Cliff Lindsey, vice-president of office automation service for Dataquest, Inc. and a longtime Xerox watcher, added, "I'm disappointed that they haven't moved faster and taken advantage of the pioneering technology they in-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vented. I've been waiting for the past three years for them to capture a major market share and they simply haven't done it. The next 12 months will be extremely critical for them."

Although Xerox has been on schedule with its announced products since 1976, the marketing hasn't been on course, according to Lindsey. The industry thought Xerox would dominate the workstation market, but it hasn't lived up to expectations. The price/performance range of the Star was too steep for the mass market and represented a radical change for the office. "It required a lot of system analysis in the office to make it fit," he said, "and I didn't see Xerox doing a lot of that."

Xerox recently cut the price of the Star to $9,995 from its previous price tag and introduced a stand-alone version and remote version of the product. But according to Andria Rossi, a consultant with the Seybold Consulting Group, Inc., that may be "too little, too late." Apple Computer, Inc. now offers similar technology for significantly less money on both its Lisa and Macintosh microcomputers, and the Star is not innovative anymore. "The Star may have a chance if an organization has let Lisa in the door and then wants to move up to a more sophisticated system. But that isn't all that likely. Xerox just took too much time."

To Xerox, the Star has not been the failure that others have dubbed it. "We're selling Stars," Adams stated. "We may not be selling as many as we thought when we announced it, but we're selling them. They're going to people who are very heavy in the composition area; who need a very good screen and rapid response on a variety of functions. The processor on the Star is much faster than the Motorola 68000."

Xerox has admitted, though, that its workstation strategy needs attention, and the company claims to be addressing that issue. According to Adams, the company erred by introducing an eight-bit system (the 820) at the same time the industry was turning to the 16-bit PC. "We've been behind the power curve ever since," he said. Xerox tried to address that issue last May by introducing its 16/8 micro with both a Z80 and 8086 chip. The 16/8, not IBM-compatible, does little more than "keep them in the business," according to Lindsey.

Kearns stated firmly that Xerox must have a viable PC offering for its customers, but added that it will not take on Apple or IBM in the broad retail marketplace. "Our main focus is to have an attractive product for our customers to tie into their networks," he said.

Adams acknowledged that Xerox is at work on a new line of workstations, but would not say what to expect or when. But he did explain that in Xerox' opinion, OA is much more than just workstations. "It depends on where you are standing to look at the universe," Adams said.

GLENN RIFKIN PHOTO

"We're doing well in some areas and not as well as we'd like in others. But we're proceeding." — David T. Kearns, Xerox' president.

While IBM has led the way in data management and AT&T in voice management, Xerox has blazed a trail of its own in document management, according to Adams. He believes that document management is the third major subset of OA and it is in this baileywick that Xerox is dominant. With its impressive line of copier/duplicators, laser printers and Memorywriter typewriters, the Stamford, Conn.-based corporation will always have document management and composition "in its heartland."

"I think a good solid printer, electronic typewriter or facsimile device is as important to a good office automation system as a workstation," Adams said.

Indeed, Xerox remains dominant in the $11.5 billion copier/duplicator business and has placed more electronic laser printers worldwide than all of its competitors combined. Perhaps its major success story to date is the Memorywriter, which in just two years on the market has tied IBM for the lead in the electronic typewriter arena.

Analysts believe the Memorywriter, perhaps with screen/memory add-on and even PC software, could well be an entry point into offices for Xerox. "But it is hard to imagine an electronic typewriter being the entry point for selling an entire office system," stated Elliott.

The analysts are also concerned about Xerox' word processing offering, the 860, which was considered innovative when introduced in 1979, but is now considered out of step. "The 860 was pretty good when it came out, but it is due for the next generation," Lindsey said. "If they are after the word processing market, the 860 isn't enough," added Rossi.

In addition, there is the issue of IBM compatibility. Shoch pointed out that Xerox offers a number of ways to interoperate with the mainframe environment, specifically related to applications.

"We will have a series of announcements over the course of this year that expand our terminal capabilities and our RJE capabilities in the IBM world," he stated. "Our current product line supports the 3270 interfaces and asynchronous terminal interfaces. It has also not escaped our attention that the [Digital Equipment Corp.] VT100 would be a particularly valuable market."

Xerox is also committed to introducing the IBM PC onto the Ethernet network; reportedly working jointly with 3Com Corp. and Visicorp on that project. "We will integrate [the IBM PC] into our environment better than it gets integrated into its native environment," Shoch projected.

With its strength in networking and its niche markets, Xerox remains a force to be reckoned with. Adams' Systems Group generated $2 billion in revenues last year and, despite the argument over what is and is not OA, it provides significant financial support to a prolonged effort in the market.

Along with its financial soundness, Xerox has other resources at its disposal, according to Steven Abraham, an analyst with Price Waterhouse & Co. in Los Angeles. Abraham pointed to the Palo Alto Research Center (Parc), which was responsible for much of the trendsetting technology introduced by Xerox over the years and which continues to provide state-of-the-art research for Xerox.

Abraham acknowledged that Xerox has experienced internal marketing difficulties, but said that under Adams, those problems could well be solved. "Now that all the divisions are reporting to Adams, there should be a much clearer sense of marketing strategy. There's a tremendous internal commitment to solving these problems. People haven't seen a quick response at Xerox to the market changes, and that has justifiably brought about a negative view. But I'm optimistic. There's a lot of talent there."

Optimism, of course, does not guarantee success. Xerox has some serious catching up to do with major competitors like IBM and Wang Laboratories, Inc.; industry watchers, after years of disappointment, tend to be skeptical.

The company needs a lower priced, high-performance workstation — somewhere in the $5,000 price range — tied into Ethernet, both Lindsey and Rossi agreed. It also needs a state-of-art personal computer, and that machine must not get caught in the six- to nine-month time lag other Xerox products have found themselves in, according to Lindsey.

"We predicted in 1980 that if a vendor wanted to be a winner in the second half of the decade, it would have to infiltrate a large part of the market in the first half. That seems to be coming true. And for Xerox, that puts them in a critical time window. They don't have a large installed base out there and don't have a lot of time to get it," Lindsey said.

"I'd been holding out hope for them for a long time, but now I'm pessimistic. It's going to be slim pickings out there in the next five years. I'm just amazed at how little they've capitalized on some great technology," he noted.

Elliott of IDC added that Xerox' best strategy might be to focus on its strength in the imaging area and to produce high-quality, hard-copy output incorporating text and data. "This might mean that Xerox would find itself at the downstream end of the office information flow, formatting and printing information stored and manipulated by equipment from other vendors. This is not the most glamorous niche in the office of the future, but it is likely to be a profitable one," he said.

Xerox, however, has no intention of settling for a niche market. With a sales and service organization numbering 40,000 and a restructured marketing plan, the company has its sights set on the total office market.

Chairman Kearns admitted Xerox may have had too much of a "Xerox alone" strategy five or six years ago, but said that the company is on the right track now. He acknowledged that there is much training and restructuring to be done, but despite the cost and difficulty, "When you look at the basic organization we have versus anyone else except IBM, for us to take a back seat in this is absolutely not necessary."

Adams echoed those sentiments: "I believe we're in a long-distance race here and we're going to start looking at who will be the winner in 1990, not 1984. You don't want to get too far behind the leaders, but you also don't quit the race just because you find someone ahead of you." OA

Rifkin is senior writer at Computerworld OA.

Nothing Could Be Finer Than OA in Carolina

BY DAROLD R. KLAUK

No matter how much planning goes into an office automation project, it pays to prepare — if not for a disaster, at least for a changing environment.

Like many public and private organizations, the state of South Carolina found itself juggling a fluctuating economy and rising operating costs at the same time that it experienced a growth in demand for services. It became increasingly evident that the state needed a strategy to reduce operating costs and increase office worker productivity.

An OA pilot project was initiated to determine how much automated office technology could help us to achieve these objectives. One of the first steps in the pilot was a preimplementation study, which looked at the current work load of various offices, identified potential productivity areas and selected individuals to participate in the project.

Next, an ergonomics, or human factors, task force was formed, consisting of individuals with interdisciplinary skills needed to focus on users and their needs. They represented the areas of personnel, legal, management information systems (MIS), planning, training and human factors.

The group's first task was to issue a request for proposals (RFP) specifying the perceived functional needs of the selected office work force. The evaluation method did not use cost as the sole guideline. Several weighted criteria included functionality, support, cost, ergonomics, compatibility, expandability, reliability and documentation and training. Before a contract was awarded, a full-function demonstration was required, and all proposed software and hardware products had to be in current production.

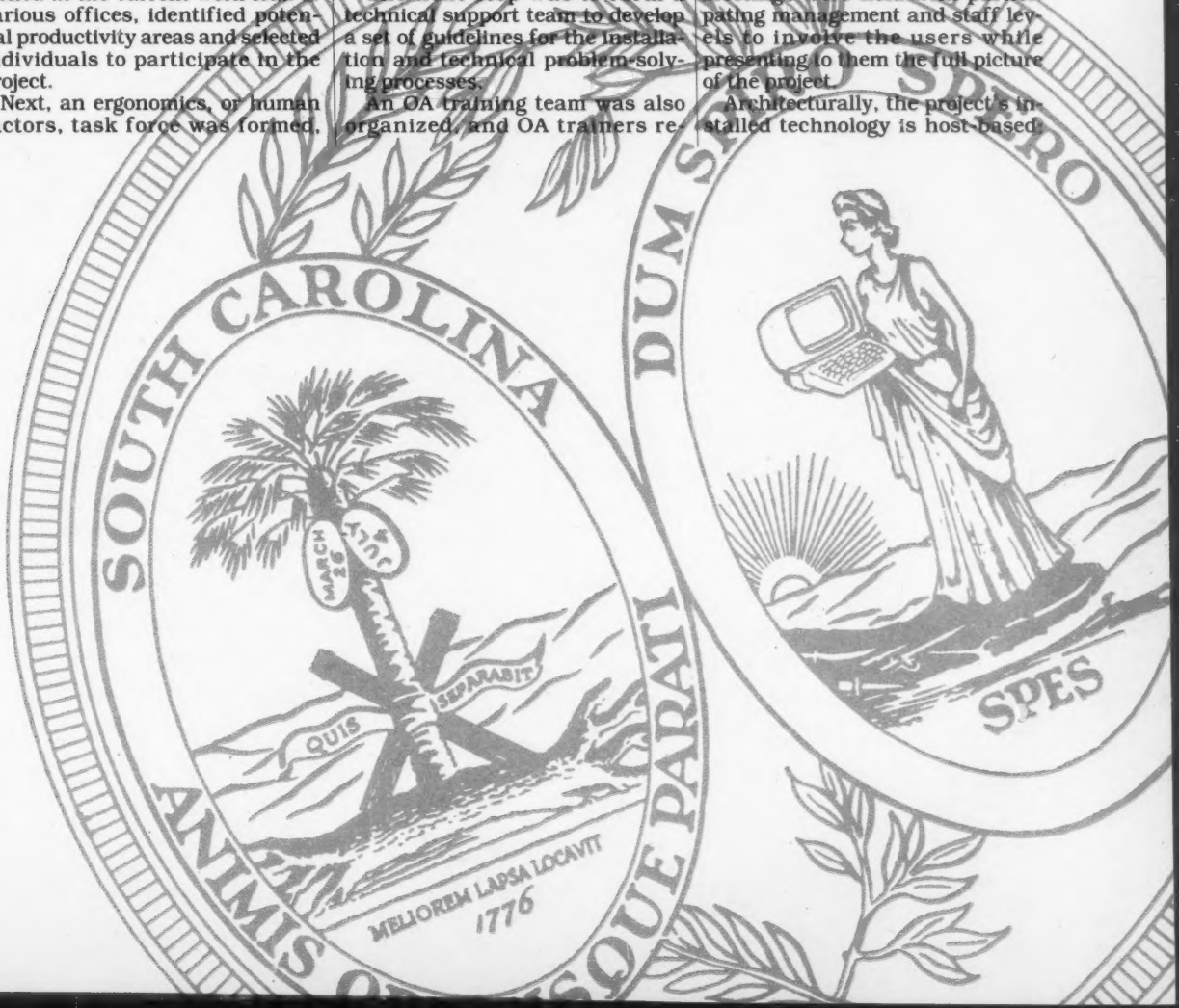
The next step was to form a technical support team to develop a set of guidelines for the installation and technical problem-solving processes.

An OA training team was also organized, and OA trainers received in-depth training in each function that would eventually be taught to the end users. A self-paced training program was developed and a training center was specifically designed for and dedicated to the trainees.

The installation of the equipment and the institution of OA training were done in phases. A test group functioned as "guinea pigs" in all phases of training. This group represented various job skills from the clerical, technical and management office worker levels.

From the start, the OA program adopted a strong "people, not technology" philosophy. One result of this approach was the development of OA-orientation seminars for users prior to the installation of equipment and any OA training. Meetings were held with participating management and staff levels to involve the users while presenting to them the full picture of the project.

Architecturally, the project's installed technology is host-based;



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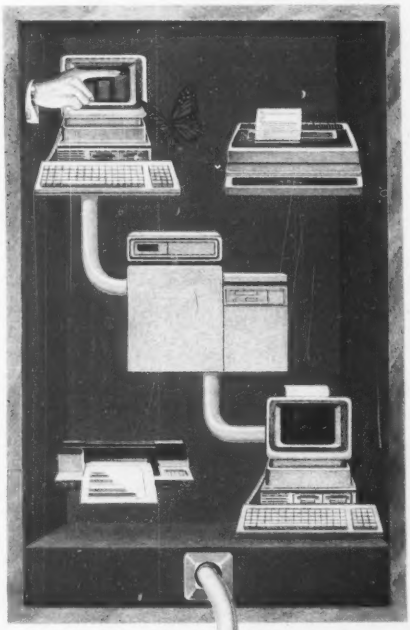

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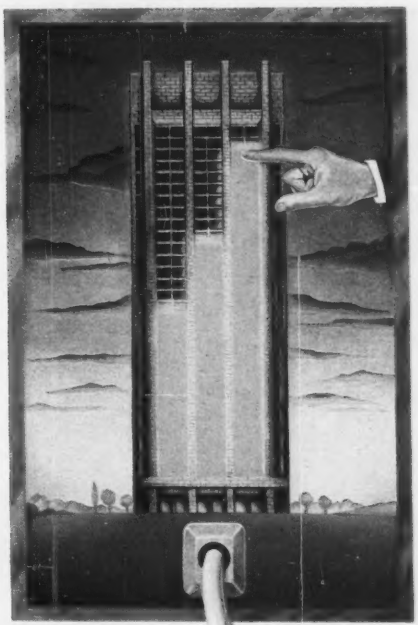

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minicomputers are located at three sites, with each processor attached, directly or remotely, to the host. For office functions, the host provides services for central storage, retrieval and distribution of documents and messages. Local processors provide text and records processing capabilities, office administrative functionality and access to a host computer using multifunction workstations.

The functions implemented and evaluated include electronic messaging, calendaring, document distribution, word processing and records processing as well as access to DP applications and resources at the host in the batch and interactive modes. Additional OA implementations have occurred in other offices using equipment compatible with that of the pilot project forming an OA network.

The project was not without problems and unknowns. Most notable was the state of constant change that occurs in most organizations and that in turn has an impact on the staff.

Because of the excellent planning effort, the implementation of the project progressed with a high degree of confidence that all elements were in place. Nevertheless, the project was not without its share of problems and unknowns. Most notable among these was the state of constant change that occurs in most organizations; these changes in turn have an impact on the work force. Reorganizations affect office workers' physical locations, job roles and tasks. Also, people retire, new workers are added and others move on to other employment. These factors directly affect the implementation of the project: installation schedules change as a result of equipment relocations; training schedules must be altered to accommodate new users. Users, project implementors and management should recognize that these changes are inevitable and they cause delays in a project's scheduled implementation. They also affect any preimplementation, baseline productivity measurements that were taken.

Another area in which problems can occur is in the installation of the equipment and cables. This installation should be done by experienced individuals, or at least under their guidance. In this stage of the implementation process, many unpredictable and frustrating problems may surface in such areas as fire code compliance, adequate power sources and proper electrical grounding, particularly in older buildings. Unless allowance is made for these problems, the impact on budgeting and scheduling could be substantial.

The other area in which problems arose was training. Planning efforts defined a strict requirement to meet end-user needs; the emphasis was on user training and support. Based upon experimentation with the test group, a set of courseware was assembled and optimized. The training process was changed to accommodate users in the following areas:

- Length of the course.
- Number and type of functions taught.
- Duration and timing of classroom sessions.
- Availability of equipment.
- Nonattendance at classroom sessions.

Each of these changes had a ripple effect on the total training program as schedules were juggled, causing delays in completing training.

Trained and back at their work places, users placed added demands on the OA team for handholding support. This additional support was necessary to assist users as they became more proficient in using the technology and applied it to automating existing manual office applications. At this stage, an office applications support group with adequate resources is required. Without it, the users' attitudes suffer, which affects their support of the project's goals.

In spite of the implementation difficulties, however, the pilot did have demonstrated successes. Recent probes into the affected offices indicate the installed OA technology has been well received. Productivity gains have been achieved, and cost-avoidance has been realized. In addition, the quality of both work product and work life has improved.

The project has provided the staff with learning experiences — both good and bad — as a pilot project should. One objective of the pilot was to test the OA waters and to use the lessons learned for future OA implementations. The progress to date seems to indicate that OA is indeed the means to do more work for less cost.

The very implementation of OA technology should be beneficial unless a major mistake is made in selection, installation, training or support. The degree of the project's success can be measured, for example, in terms of the number of user requests for more devices. Through word of mouth, the project will develop a reputation — good or bad.

Most certainly, the sophisticated word and records processing features have made it possible to produce documents and correspondence of better quality, faster and easier. Also, a few managers are now effectively generating their own correspondence, replacing paper and pencil with on-line electronic document creation.

Users' diversified application needs reinforced the original assumption that they should be provided with a single type of device — a multifunction workstation. This device provides access to automated office functions and DP applications. Cost-avoidance is achieved as the number, type and support of workstations are reduced.

Another of the successes was the move from a dedicated WP center environment to a local distribution of the text processing capabilities. Localizing the author/text-creator relationship has been extremely productive.

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sult of being able to perform tasks more quickly, easily and effectively.

The following guidelines should be relevant and useful to those considering OA implementation:

Planning Phase:

- Initiate OA on a small scale. This not only minimizes risks, such as cost and disruption, but also provides options to explore multiple vendor capabilities without substantial investment and commitment to any one vendor.
- Consider leasing the equipment instead of purchasing it outright. This can help eliminate a locked-in committed feeling if a change in technology becomes necessary.
- Check existing office procedures for redundancies and bottlenecks. Procedural changes could bring about surprising results.

Place reasonable goals and expectations on the people and the project itself. Establish what you mean by a "successful" effort so you will know when it has (or has not) happened.

- Look carefully at each user's needs. One type of workstation will probably not fit all needs.
- Place reasonable goals and expectations on the people and the project itself. Establish what you mean by a "successful" effort so you will know when it has (or has not) happened.
- Don't lose sight of human factor issues — for example, proper placement of equipment in individual offices, CRT-type tables and proper chairs.
- Involve users early and give them decision-making tasks. Their attitudes will significantly affect the project's progress. Establish an OA steering committee.
- Don't allow the techies to run the show. Get a mix of users involved, each with voting power. Establish a users group.

Implementation Phase:

- Remain flexible as the implementation activities progress. Many factors will arise and have an impact on predefined planning and scheduling activities.
- Support end users' DP needs as well as their OA needs. Don't oversell OA functions; DP applications are still part of the office environment.
- Be cautious about introducing new technologies. Give end users ample time to adapt to new devices before you ask them to switch devices.
- Listen to the users' suggestions. They are the real-world users and your best source of knowledge on their jobs and needs.
- Continue giving office applications support to users. Over time, however, they will become quite self-sufficient.

Evaluation Phase:

- Establish standards wherever feasible. Examine the issues of functionality, connectivity, compatibility and control.
- Be prepared to present quantitative gains to management. Intangible benefits alone probably won't justify expansion of the current project or start-up of future ones.
- Document what you learn — both the successes and the problems — for future implementations and other implementors.

In summary, one of the original precepts about OA technology was that it would allow more work to be done for less cost. Indeed, more work can now be done and more information is now available than before the introduction of the OA technology. Initially, however, this comes at an additional cost. The return on investment cannot and should not be measured in the short term. Over time and with consideration for intangible as well as tangible benefits, the OA system will prove not only beneficial but also essential. OA

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OA FOCUS: COMMUNICATIONS

Office communications technologies are a vital, fast-changing and often baffling part of the overall office automation picture. What may be sufficient for today's needs could be hopelessly ineffective in a few years. Integrating the organization's planned business growth with its future communications needs can be an overwhelming task. This Focus Section may provide a glimpse into future technologies and how to plan for them today.

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LOCAL-AREA NETWORKS

By David L. Terrie

Interest in cable-based local-area networks stems from the simple fact that business has a wiring problem.

After the dense fog of bandwidths, access methods, topologies and media has been cleared away, cable-based local-area nets remain; potentially, they can provide flexible low-overhead networks, peripheral sharing and information sharing.

Desktop computers have advanced far beyond network supply lines of traditional distributed processing. Each user maintains his own data base, takes responsibility for his applications software disks, for backup and security and for archives when his hard disk is too full.

Furthermore, resource sharing (storage, peripherals, higher level processing and applications and communications facilities) has not existed.

Prices are falling fast for printers, mass storage and communications facilities, but the need for more sophisticated (and expensive) facilities is rising even faster.

Increasingly, users will want such facilities as laser printers, image scanners, presentation-quality color graphics output, mass storage, shared files and data bases, improved network management and sophisticated Systems Network Architecture links. Sharing these facilities will reduce their costs to the individual user, but it will still result in a significant net rise in the cost of computing for desktop computer users.

Local-area nets will not only facilitate access to sophisticated shared resources, they will enable increased architectural flexibility.

Along with facilitating access to sophisticated shared resources, local-area networks will enable increased architectural flexibility with respect to both processing and storage.

Of significant importance among these opportunities is the concept of the virtual desk. Wang Laboratories, Inc., for example, gives its Professional Computer users this capability on its VS systems, allowing the use of the VS hard disk as if it were resident in the workstations. This will soon be a standard feature for all system vendors' desktop computers. Storage will move back to center, including better back-up facilities, better data security, better data consistency and easier software updates.

The diskless desktop computer is what would have evolved had networks proliferated simultaneously with desktop computers. Processing power — but not necessarily storage — would have continued along its outward path to the workstation. (Datapoint Corp.'s Arcnet architecture is a singular example of this development). As it is, with desktop computing having first proliferated independently of the office systems architecture, desktop computers have not until recently been designed to be a compatible element (running proprietary software) of office systems.

Four basic workstation options will emerge:

- An intelligent terminal typified by IBM's 3270 family or Digital Equipment Corp.'s VT 100/200 family (that may take the form of a terminal phone like Rolm Corp.'s Cypruss or Northern Telecom, Inc.'s Displayphone).
- A diskless desktop computer utilizing a virtual disk at the file server and/or the utility processor level.
- A desktop computer with a local hard disk for added redundancy (in case of network failure) end performance.
- A full desktop computer with dual floppies or a floppy and a hard disk to allow full network independence and archiving capability.

A key proviso to make diskless desktop computer architecture feasible is a shared repository where the operating system and applications software reside. The best approach in the design of this facility may be to download the operating system when the workstation is turned on and for applications to be downloaded subsequently according to the user's stored profile.

If multiple standard and proprietary operating systems are available to the user, at power-up a standard menu can be downloaded that would ask for the user's ID and then provide a choice of profiles. Where possible, however,

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the required operating system should be transparent to the user, who is primarily concerned with the application.

Though cost per connection will play an important role in the overall shape of the cable-based local-area network market, network software will play an equally significant role in the fortunes of individual vendors. At this stage in this very young market, hardware has been the name of the game. This stage is similar to that of the desktop computer market prior to the advent of the IBM PC and MS/DOS' dominance as the operating system for PC software developers.

However, when the bulk of the market settles down and adopts the IEEE 802 and other de facto standards, the differences between networks will largely be defined by software. Network software provides the functions above the physical and data link layers. Systems vendors, such as IBM, Wang and DEC, already provide network applications such as electronic mail and data access and security functions as parts of their systems software environment. But PC nets linking formerly single-user systems must provide these functions themselves.

Here, as in the desktop computer market, ease of use and functionality are defined more by software than hardware, especially in the workstation environment. A local-area network should have at least the following software-based facilities:

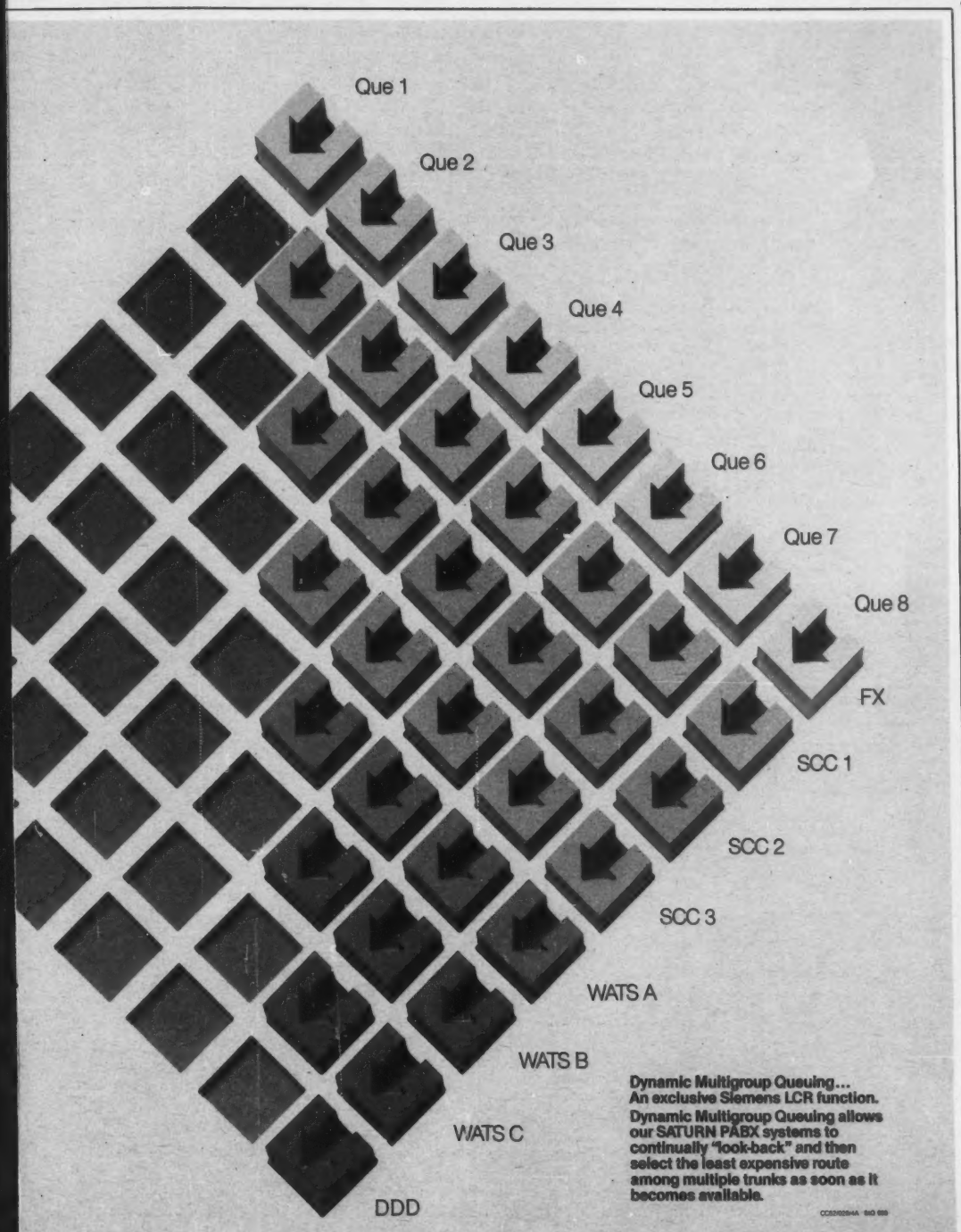
- The file server allowing concurrent updates (or at least concurrent access), record locking and multiple levels of security.
- Print server software to spool print requests, so that print jobs can be queued on the print server. Further, multiple printers should be supported for letter quality, graphics (matrix and/or laser) and draft printing.
- Electronic mail software that stores a pointer in a file server. Any file should be sendable to individuals or broadcast lists. Users should be able to append comments and so on.
- Strong gateway and bridge facilities for internetwork communications.

Cost per connection will be important in the overall shape of the cable-based local net mart, but network software will be equally significant for individual vendor fortunes.

One key benefit of incorporating a local-area network at the systems level is that systems no longer have to process routing and transport functions (as is the case in a point-to-point network). In the absence of a local-area network, these chores can be off-loaded with a communications processor. This, of course, is an expensive solution, especially since each node would require a front end. If a communications processor is not utilized, a portion of the nodes' processing resources must be partitioned to handle these chores, which leaves less processing power for running applications.

These facts say two things: No vendor will be able to provide cost-competitive solutions without using a local-area network in its systems architecture, and the market for communications processors will be dampened considerably (since only one node on a local-area network needs to attend to these chores).

On Page 38, some common user questions are answered.



Some Common User Questions

Why consider a local-area network in the first place if a private branch exchange (PBX) can switch data with installed wiring?

For two reasons: First, the overhead efficiencies at the systems (mini and mainframe) level in a network architecture will be cut considerably by implementing a local-area network to replace a point-to-point network. Second, the 56K bit/sec maximum data rate for digital PBXs is not adequate for heavy file-transfer-oriented communications.

Users of transaction-oriented terminals and desktop computers with light file transfer requirements will be adequately served by a PBX. But many desktop computers and high-performance engineering workstations will be much better served by local-area networks offering 20 to 100 times the throughput. (A 1M-byte file would take less than a second on an Ethernet local-area network vs. a minimum of 20 seconds on a PBX.)

For these reasons, users should lean strongly toward implementing local-area nets for departments or work groups using desktop computers. Although not many users are communicating today, better software links to corporate data and growing user sophistication will result in a dramatic increase in users downloading files to their desktop computers.

I'm working out a corporate policy on local-area network implementation. What do you suggest?

There are two key elements here. First, should the policy attempt to control growth and implementation from the top (for example, the management information systems shop/systems environment) down, or should growth be monitored at the department level?

There are two separate (but not conflicting) goals to strive toward. The first is to solve end-user problems as cost-effectively as possible. One or two PC nets or departmental nets should be standardized on, and growth allowed to proceed as islands. In large sites where the host or satellite processor vendor offers a cost-effective solution, users should take advantage of it. However, third-party solutions will not create significant compatibility problems given strong bridge and gateway facilities.

The second goal should be to improve the efficiency of the systems network via a backbone. Implementing a local-area net to replace a point-to-point net may reduce overhead enough to make the freed-up applications processing pay for the implementation in a short period.

These two environments should then be merged as user requirements dictate. In the meantime, users will get the benefits of resource sharing (while still accessing corporate data via modems if necessary), and the network overhead will have been reduced considerably. Both steps will provide short-term benefits without creating long-term havoc.

How can a user be protected against having to rewire a building, given the difficulties in accurately predicting network capacity needs five or 10 years from now?

A tiered or hierarchical approach to networking may be the soundest strategy. It allows users to pull broadband or fiber-optic cable for the backbone, while opting for more cost-effective twisted pairs or baseband cabling in the workstation environment. This is, in fact, what IBM, Intel Corp. and several other vendors are pursuing.

The tiered approach has the following advantages:

- It simplifies network management and diagnostics by isolating performance and fault measurement to a small number of nodes.
- It limits the effects of network failure to a small group of users.
- It allows network administrators to design cost-effective solutions based on appropriate classes of service for departmental or application needs (a basically direct relationship exists between bandwidth and cost-per-connect).
- It allows users to implement local-area nets on an as-needed basis without jeopardizing the corporate networking plan's viability. Small, low-cost departmental local-area nets can be implemented individually and then strung together via a bridge to a backbone.
- The tiered approach will permit users to upgrade subnets or the backbone independently to enable use of the best available technology that may not be available from the systems vendor.

(Care should be taken in the design of the network that the majority of packets do not have to cross a bridge; these lines usually fall quite naturally along work group or departmental lines.)

What is the best approach to the issue of network topology?

Don't be enticed by the pretty pictures often seen in local-area network vendors' brochures. Notice that those buildings are empty. Yours won't be (unless you're constructing a new building). In an existing building, the conduits from a mini or other host to work areas are going to reflect the current star topology used. Because local-area networks offer both physical and logical configurations, many sites will find it best to use a physical star to segment a floor into quarters, fifths or whatever the layout dictates.

After this backbone has been laid, physical buses (or stars, in IBM's case) can be used to hook up the workstations in the area. Cable mass will have been reduced and connectivity increased.

Will it be possible to reuse existing cable plant?

Yes. Vendors (notably IBM) will use a "baluns" to adjust the impedence of installed cable for terminals to that of their local-area networks.

Are fiber-optic networks usable today? If not, should a user consider pulling fiber-optic cable anyway?

Vendors still haven't solved the problems associated with tapping optical fiber. Nevertheless, two things are certain: These problems will be solved in the next three to four years; second, fiber-optic networks will dominate the backbone market by the end of the decade.

For large networks requiring multiple channels, broadband is still the best choice. The primary exceptions to this rule will be at data centers requiring very high (over 20M bit/sec) data rates; campus environments; and in government, military or other applications requiring the security inherent in a light wave system.

Vendors such as Siecor and Ungermann-Bass, Inc. are using a physical star configuration for the backbone that allows fiber to be used as a backbone with connections at the ends only.

IBM's token ring backbone will probably also utilize a physical star topology for this reason. OA

Terrie is director of office systems research at The Yankee Group, a Boston-based market research and consulting firm.

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STRATEGIC PLANNING

By Dixon R. Doll

The past two years of fast-changing technology and industry restructuring that have resulted from the AT&T divestiture have had quite a significant impact on most U.S. organizations.

Most companies now recognize that the time has come to apply formal planning methodologies.

These methodologies are based on the fundamental notion that business strategic planning is the principal process that feeds information systems planning, office automation and telecommunications strategic planning. Figure 1 on Page 41 portrays a common set of steps in developing prioritized actions or programs on which user organizations spend time, money and personnel resources. The output of the planning process can be simplistically viewed as a prioritized set of actions or programs that best meets the business needs of the user organization. It is clear from Figure 1 that telecommunica-

Why is Cullinet's information systems strategy creating so much interest?

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*Bob Goldman**

Each day, representatives of as many as eight major corporations from the United States and around the world visit Cullinet's headquarters. They are coming in increasing numbers because they've heard what Cullinet is doing in information systems technology. After the meetings, they are convinced that Cullinet's direction in information systems makes sense for their organizations. It is, in their opinion, the only coherent and intelligent approach available.

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In order to fulfill that promise, the full integration of Database, Applications and Decision Support Systems is required. When management understands the importance of the integrated software solution, the result is a renewed enthusiasm by them for support of the information systems activities of their companies. They realize that their respective companies must put in place new information systems in order to compete or even survive in the future.

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		Wilmington, DE	May 22

**Robert N. Goldman is President of Cullinet Software, Inc. Starting with the Company over ten years ago, Mr. Goldman has been intimately involved with the evolution of Cullinet's software architecture. In various roles, including Director of Software Development to Executive Vice President and in his current position as Chief Operating Officer, Mr. Goldman has been a key contributor to the product and strategic directions of the Company. He holds a Bachelor of Science Degree in Computer Science from Purdue University.*

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tions requirements exist as a direct result of two sets of needs. The first is the need to support other technology plans, including DP and OA. The second consists of specific business needs to increase productivity and profitability in ways that may not depend on information systems and OA per se.

The last 15 years has seen a rapidly exploding set of new applications for telecommunications coupled with industry deregulation and rapid technological change. This combination has dramatically increased top management and end-user awareness of innovative ways of using telecommunications services. Telecommunications organizations have moved through several distinct stages of sophistication in most customer organizations. In the late '60s and early '70s, they were generally relatively low-level organizations that did little or no planning and were mostly concerned with operational activities.

Now, however, the charter of the typical telecommunications organization has changed. It is normally charged with:

- Providing internal users services that are cheaper than the services publicly offered in the marketplace.
- Packaging technologies to provide new services that are important to the success of the business but unavailable in the public marketplace.

If the internal organization is unable to do either or both of these things, the telecommunications organization has little or no reason to exist. Many enterprises are fast recognizing the important opportunities associated with selling spare capacity noninternal networks, and with becoming, in effect, resellers or brokers of advanced telecommunications services. Numerous Fortune 500 companies have already entered the commercial market, reselling excess capacity in their networks to business users whose requirements overlap their own.

The successful telecommunications organization will recognize that it must, first and foremost, be a responsive service-providing organization. It must keep closely in synchrony with the business needs of the internal users, fast changing technology and various external factors. These external factors will include not only changing tariffs, political developments and standards, but other nontechnological factors — for example, the cost of business travel and jet fuel — that influence the costs of alternative ways of solving the business' problems.

Organizations are becoming increasingly aware of the need for broad thinking about different ways of solving business problems, especially in areas that involve new uses or expanded uses of telecommunications. Businesses are concerned about the flood of paper. They would like to move information around inside the enterprise and across enterprise boundaries. They would like selected access to information known to be stored in various files and data bases. They recognize that information movement can indeed take place in numerous ways, some of which don't involve the use of telecommunications services as we know them.

They carefully investigate a variety of telecommunications-based and alternative methods for solving business problems. Among those methods are courier services, document distribution services and business travel, the soaring cost of which is a growing concern. For example, at a recent American Express seminar, John Reiner, senior vice-president, presented statistics indicating that American business travel costs soared from $35 billion per year in 1972 to $75 billion per year in 1982. His forecasts predict total business travel expenditures climbing to $124 billion by 1985 and $250 billion by 1990!

Growing concerns over productivity, soaring travel costs and the pressing need for better ways of solving problems have spawned considerable interest in teleconferencing as a principal ingredient in the strategic plan.

One way to determine the business needs to be supported is through a multifaceted program of interviews and questionnaires of executives, DP/information systems users and line managers. In all cases, the objective should be to identify areas in which better ways of using telecommunications technology could benefit the

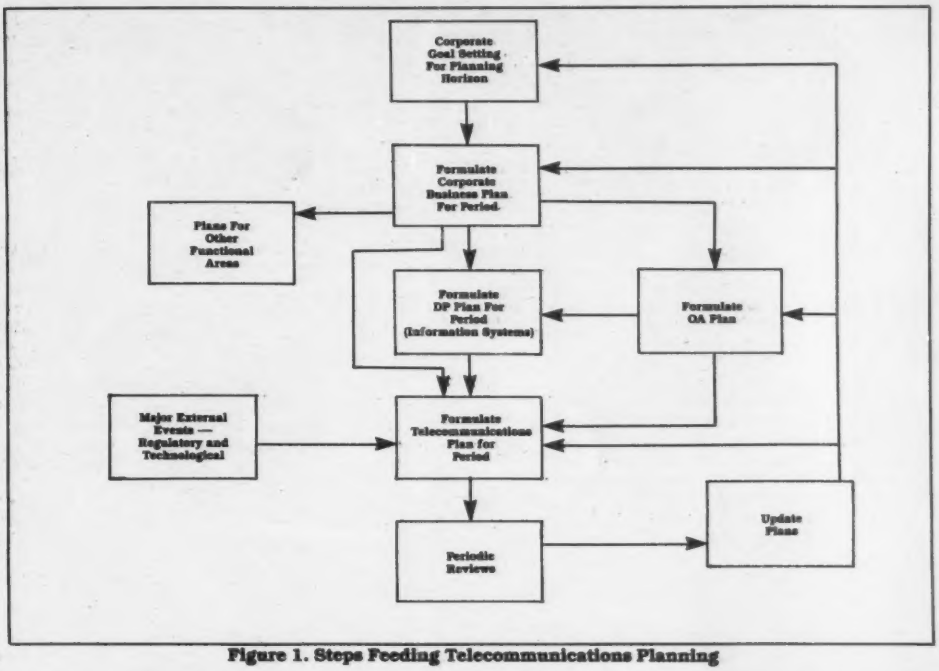
Corporate Goal Setting For Planning Horizon
Formulate Corporate Business Plan For Period
Plans For Other Functional Areas
Formulate DP Plan For Period (Information Systems)
Formulate OA Plan
Major External Events — Regulatory and Technological
Formulate Telecommunications Plan for Period
Update Plans
Periodic Reviews

Figure 1. Steps Feeding Telecommunications Planning

HOT BUTTONS

- Excessive phone tag.
- Soaring travel costs and wear and tear on people.
- Obtaining access to necessary information.
- Inadequate document composition and distribution capability.
- Multiple independent wide-area networks.
- Excessive cabling costs for in-house networks.
- Multiple terminals required for accessing different applications.
- Restrictions of dedicated computer vendor network architectures.
- Inadequate support for dial-up terminals.
- Organizational structures (corporate vs. divisional).
- Networking extensions to customers and distributors.
- Electronic mail (text and voice) opportunities.
- Teleconferencing.
- Blocking vs. nonblocking switch.
- Use of satellites.
- Multivendor coordination — a nightmare.
- Network troubleshooting tools, techniques.
- Local-area networks.
- Centrex replacement plan.
- Phone system upgrade.
- Cost and performance optimization — existing and planned networks.
- Cost-allocation systems and procedures.
- Service-level goal setting (availability and response time).
- Service-level tracking and reporting.
- Network management and administration.
- Transborder data flow.
- Network support for PCs.
- Presentation-level protocol conversion.
- Private microwave and fiber-optic systems.
- Voice data integration (all levels).
- Synchronous data transmission through computerized branch exchange.
- Noncoded information device support.
- Public data network: economics; international accessibility; device support; bulk data transfer security; above-transport services.
- Vendor relationships: AT&T Information Systems vs. Bell Operating Cos.; end-to-end providers; other vendors.
- Resale carrier opportunities.
- Exploiting forthcoming T1 services.
- Multipoint data networks — what happens?
- Enhanced gateways and bridges: local-area net to wide-area; inter-local-area net, inter-wide-area net.
- Opportunities for portable terminals, personal computers.
- Speech recognition opportunities.
- Lease vs. purchase telephone equipment.
- Other bypass technology opportunities.

enterprise. The interviews have several functions. They:

- Identify problems (real and perceived).
- Articulate changes in strategic business directions which must be supported by the telecommunications plan.
- Produce principal documents on which the plan itself must be based, namely, the prioritized list of key issues and supporting business requirements for the planning horizon.

Normally, the planning horizon consists of a five- to 10-year window. Actions, projects and programs slated for the next year are usually considered tactical. Complementary actions and directions scheduled for the remainder of the planning horizon can be viewed as the strategic piece of the directional plan.

Every organization will articulate its principal business needs differently, but several dozen typical key issues seem to show up in most companies as the principal areas of concern (see "Hot Buttons" on Page 41).

After these areas of concern have been defined, business requirements are summarized and presented to top management for their review. When the accuracy of these requirements has been established and a priority assigned to them, the next move can be taken. This consists of the all-important steps of identifying alternative solutions, evaluating them and ultimately selecting the preferred direction.

The best way to get from here to there (the objective of the strategic planning exercise) depends on the organization. It must clearly have a sense of vision about where it thinks it wants to be in office communications at the end of the planning horizon. Although enterprises vary in their descriptions of exactly where they wish to be in the future, most tend to agree that the general level of functionality and capability shown in Figure 2 is one they would like to work toward.

The plan must involve laying out a time-phased set of actions that can be taken to specifically bring about the general levels of functionality implied in Figure 2. This step will specify in detail the physical interconnections, services from common carriers, wide area networks, local-area networks, external network gateways and other levels of functionality required in a specific network plan for a particular user.

Now comes the most challenging and interesting activity in the entire strategic planning process. After the needs have been established, they can be laid out on a time line to establish a point of reference, based on existing network configurations. The planning exercise must define a series of paths for moving the enterprise from where it is today to where it wants to be in the future. The steps in the plan identify specific

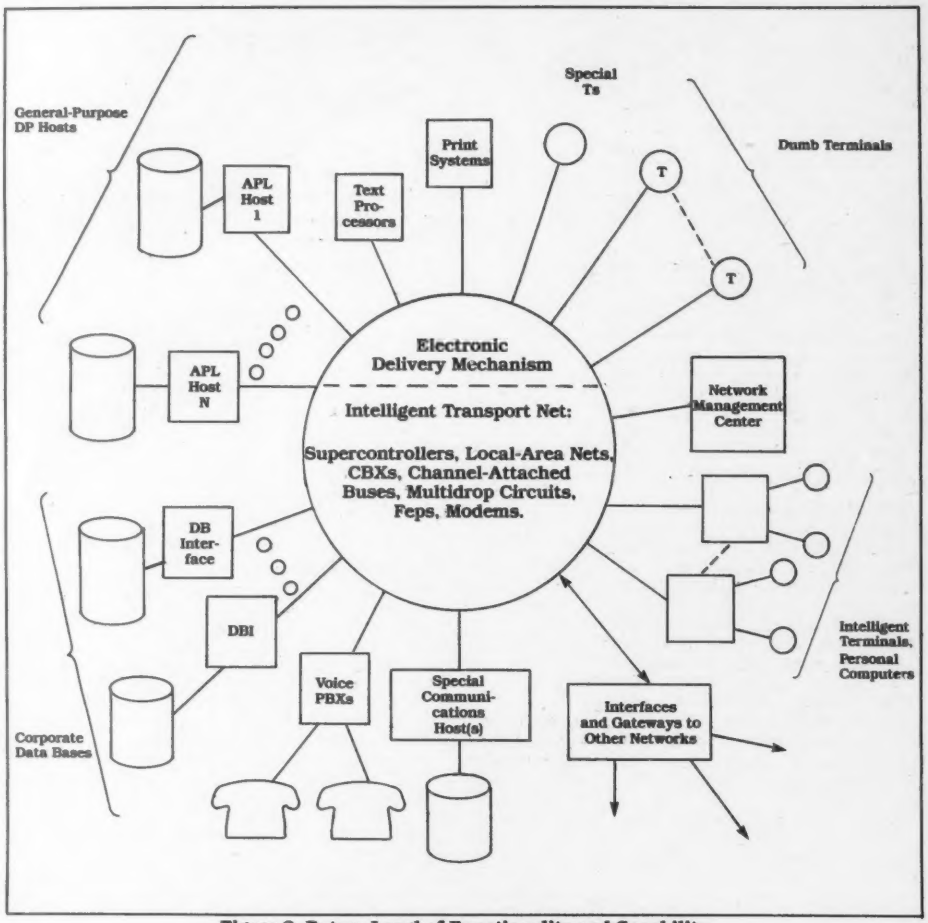

Figure 2. Future Level of Functionality and Capability

building block procurements and interconnections to be made across the plan's timeframe.

In developing a list of alternative networking strategies, planners must comprehensively and exhaustively evaluate a wide range of factors, including the wide proliferation of communications network service alternatives.

Constraints will exist as a result of equipment decisions in the areas of PBX, local-area networks, technologies, gateways to external network services and the selection of DP and OA vendor network architectures — for example, Systems Network Architecture, Decnet and DIA/DCA.

Priorities must be given to installing specific telecommunications technologies and applications. Alternative ways must be found to satisfy business needs through the development of realistic, time-phased actions (commonly called roadmaps) that enable the customer to move in the direction of its goal at the end of the planning horizon. A plan is not a single path on the roadmap. A plan recognizes the need for alternative courses of action and contingencies that may be necessary in the future as various external factors change.

The analysis of the strategic networking alternatives and the formulation of the specific steps in the plan then proceeds with a careful assessment of each alternative step along the various paths on the roadmap. Each potential step has certain associated cost implications, personnel and staffing requirements, functionality enhancements and constraints. Most important, each of the alternative paths and constituent steps will not only have an impact on one or more of the prioritized user needs in varying manners, it will also produce attendent risks to the enterprise if that step is taken.

The process of selecting an organization's best path involves a careful assessment of the advantages and disadvantages of each major alternative path identified at the beginning of the architectural definition step. The ultimate strategic plan will be the result of a highly artistic exercise of sorting through a bewildering array of complex options. The user must understand the consequences of making fundamental commitments to go in certain directions. For example, if major investments are made in new computerized telephone systems in conjunction with the opening of a new plant or facility, such equipment will create a natural potential hubbing site for enterprise telecommunications networking activity in that particular metropolitan area or region of the country for many years into the future.

Users must also make certain that the alternatives they are investigating provide adequate capacity and expansion characteristics. An expensive procurement today should not become out of date tomorrow because of technological obsolescence and adequate capacity or an inability to add new features and functions that might become important in the years ahead, long before the financial amortization of that system has been completed.

The final and perhaps most important aspect of evaluating alternative paths involves the need for performing formal financial comparisons of principal alternatives in the plan. In the final analysis, most enterprise strategic networking plans will be strongly influenced by a combination of factors including financial return on investment, flexibility, ability to remain competitive within an industry and — most important — to increase overall enterprise productivity and profitability. ‡ OA

Doll is president and chief executive officer of DMW Group, Inc., a research and consulting firm headquartered in Ann Arbor, Mich.

PC NETWORKS

By Amy D. Wohl

By the end of 1984, millions of personal computers — especially IBM-compatible personal computers — will have been delivered to office desktops.

Also by that time, far more personal computers will be in place in large companies than all the word processors ever delivered.

Who is buying these systems and for what purpose? How has their arrival in the office changed the notion of how we will computerize our front-office operations?

The office automation industry had a watershed year in 1983, when end users got bored with waiting for OA and started to act. Some customers planned for, ordered or even implemented substantial OA systems. But more customers ordered much larger numbers of personal computers as workstations, apparently confident that these workstations would eventually be the basis for office systems.

This represents a change both in what is happening (how much is being ordered when and by whom) and also

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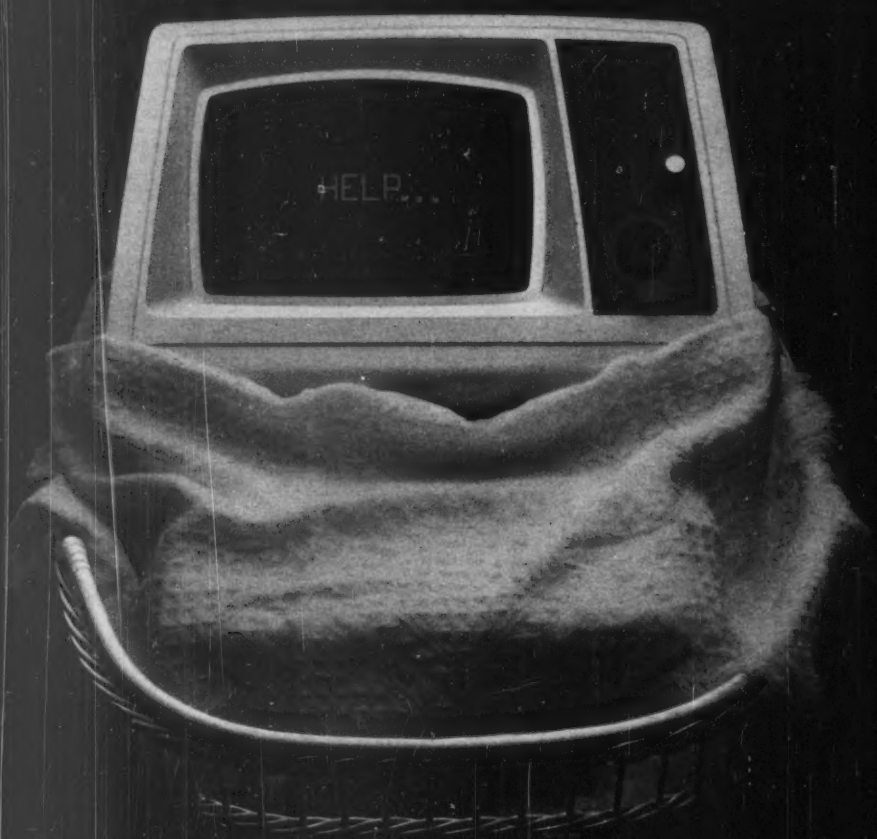

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in the underlying assumptions customers must be making in their decision-making processes.

One new assumption is that functionality now offered or soon to be offered by the IBM-compatible class of personal computers is adequate for many office users.

Nearly every month, this class of users grows larger as more capable user-friendly software is offered — and, equally important, as more and more users dip their toes in the icy waters of computer literacy and find the water warmer than they expected.

This means two strong trends — more and better software and more and more educated or ready-to-be-educated users — are coming together and reinforcing one another. This does not mean we don't need better workstations, more software capability or easier-to-use systems — it just means our increasing skills and confidence and our increasing impatience to enhance our work tools have made us reluctant to wait.

Another new assumption is that users are actually designing systems to a new kind of model. This model, bottom-up systems design, contrasts strongly with the largely top-down system design users did in the past.

Until recently, users looked first to their DP environment and then to their data communications environment and its interconnected distributed DP (DDP) environment. At that point, the user decided what kind of OA to buy and largely decided between placing OA within the DDP environment or buying separate systems, generally from a different vendor. The OA system choice then determined the type of workstation the user got for his desktop. Top-down system design assumes upper layers determine or limit lower layer choice; as a result, the workstation was often just a predetermined item rather than something users had much say in selecting.

Top-down systems design also usually assumes a fair amount of bundling at the systems hardware, systems software, interconnection, workstation hardware and workstation software levels. Only rarely did systems involve many vendors — and those systems required sophisticated, self-reliant users who would do much systems integration work on their own.

Bottom-up system design is different. It depends upon two notions. First, the workstation and its software are independently useful. Second, workstations and standards for interconnecting workstations are well enough evolved that workstation choices can be made. Underlying assumptions are that systems for interconnection exist and that the workstation being selected will plug into the system.

This process is rather like the way we buy lamps today. Within the U.S., one may buy a lamp in the lamp store, the department store, the hardware store, the five-and-dime store or even at a garage sale. The buyer can still be confident that all lamps plug into all electrical outlets successfully.

Another new assumption is that users are actually designing systems to a new kind of model. This model, bottom-up systems design, contrasts strongly with the largely top-down systems design users did in the past.

But is this confidence justified in the office? No workstation standard has actually been formally accepted and neither has an interconnect standard. No standard has been proposed and accepted on a de jure — or, in the computer industry case, "de committee" — basis. However, a de facto standard for workstations is strongly in place. That de facto standard is currently IBM's PC-DOS and, more generally, its generic MS-DOS parent.

Before you suggest that MS-DOS is an inappropriate standard for user-friendly, highly functional desktop workstations, or that no such de facto standard exists, consider two facts:

- Sales of personal computers as workstations strongly exceed sales of high-end workstations — perhaps by a factor of 50:1 or more.
- More and more customers, particularly larger business orga-

nizations, state that MS-DOS or PC-DOS is their organizational personal computer standard.

A telephone survey of a number of very large business and governmental organizations recently showed that 88% of the organizations surveyed had standardized on MS-DOS (72% had standardized on PC-DOS). Those are impressive numbers — maybe even scary ones.

Some concern is justified that in an industry where technology is moving very fast, strong acceptance of a standard could act as an impediment to users' ability to react rapidly to new or enhanced offerings. Although they would be able to implement on a more stable and less chaotic basis, users might temporarily — or even forever — lose out on some interesting or useful offerings that for one reason or another fall outside the standard.

A telephone survey of a number of very large business and governmental organizations recently showed that 88% of the organizations surveyed had standardized on MS-DOS (72% on PC-DOS). Those are impressive, maybe even scary, numbers.

For that reason, it is pleasant to report that, partly as a result of IBM's endorsement of the Unix operating system environment for the PC XT with the PCIX announcement in January, an alternative operating system environment has been proposed and is now gaining some immediate and enthusiastic approval.

Perhaps the notion that more than one flower should bloom in the garden will catch on. If so, the more monolithic aspects of standardization — particularly the stifling effect standards can have in an infant arena — can be at least partially avoided.

Of course, in order to have a successful, multiflower garden, the colors — or in this case the operating systems environments — must not clash. We will therefore quickly need:

- The ability to access both operating systems and both types of software from the same machine and the ability to access any data set from either environment. In other words, crossing over will be a requirement.
- The ability to see both environments simultaneously, presumably through a windowing environment, but one of greater sophistication than those currently in the marketplace.
- The ability to feel confident that future products will either occur within the current operating systems standards — or the knowledge that adequate migration paths and the ability to reasonably coexist will be features of new product announcements from most vendors.

Basically, when users set off down the path of bottom-up systems design, they are attacking their business problems from first principles. The workstation solves some basic problems; the fact that it will later hook into a system and solve other problems (or prevent them) is a fragile hope rather than an absolute fact.

Nevertheless, many systems-level offerings are already available for the IBM class of personal computers. Some are even IBM offerings.

To summarize:

- The user can provide systems function by attaching the personal computers to a higher level system. Systems-level function might typically include electronic mail, file storage and sharing, device sharing and communications gatewaying to other systems.

For example, the IBM PC can be provided with systems-level function through attachment to the IBM 5520, the IBM 8100, the IBM 4300 (with VM and Profs) and the IBM MVS environment (with extended Systems Network Architecture and Disoss-PS). These are only the IBM options. A number of other OA vendors will permit IBM-compatible personal computers (often including their own product offerings) to function as office workstations on their systems.

- The user could attach to an IBM or third-party network. The first IBM network, the PC Cluster, has recently been announced, and at least two other IBM networks are expected in 1984. A number of third-party nets support IBM PCs and provide some systems-level functions mentioned above.
- It will probably be possible

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very soon to look at mainstream offerings that provide interconnection and systems-level support via the telephone system through the extension of digital private automated branch exchange (PABX) function. Such offerings will initially be through the use of telephone wiring and accessing the DP capability of the PABX, but soon the opposite alternative may show up — a local-area net that treats telephone function as an extension of other information processing capability.

Without interconnection and systems-level function, very little real OA will occur, particularly the synergistic effects that offer very high productivity paybacks. It should be noted that it is important to be able to add systems-level function readily.

Some systems-level function, particularly access to data bases, can be offered without making the personal computer population into its own network. Personal computers can simply access existing information systems through more simple communications hardware and software. Here, three things should be emphasized. The first is matching the user's installed DP environment, as well as the public data network access requirements. The second is permitting data to move freely between environments, not merely to be viewed from one environment to another.

The third and final factor is to make it as easy as possible for relatively naive users to access and use data. This process can take the form of making the interconnection transparent (let the system do it) or very friendly (English menus with no strange communications vocabulary to learn). It might also take the form of easing the access of data from a complex environment on another system (the workstation as a friendly filter).

If we assume that many of us will automate our offices (and our own personal desktops) with personal-computer-level products, it is fair to ask, "Are personal computers going to be adequately useful and adequately friendly?"

If the current success of the IBM PC and its friends and relations is any evidence, acceptance has already occurred with some of us. But for many others, much more is required. Some new product offerings emphasize trying to stretch the current personal computer into a friendlier, more robust machine. Peripherals upgrades (hard disks, better or different keyboards, more memory) can make the machine more pleasant and more useful, but they also make it more expensive. In fact, we seem to have approached a point of parity: A robust IBM PC XT is now about the same price as an advanced workstation with equivalent hardware and functionality (for example, some Apple Computer, Inc. Lisa models, and the new Exxon Offices Systems Co. 750 Integrated Workstation). This should have a strong effect on the viable pricing of older and less powerful workstations which are still much more expensive.

Some offerings emphasize trying to stretch the current PC into a friendlier, more robust machine. Peripherals upgrades can make the PC more pleasant and useful, but they also make it more expensive.

A few workstations seem much more powerful on a price/performance basis; that is, their price and function taken together seem interesting. However, such products are generally not yet completed or entirely available. For instance, NBI, Inc.'s IWS seems very powerful in function (although still a bit pricey), but it's not yet really in delivery. The Apple Macintosh is so inexpensive and so hardware-robust it almost overcomes its lack of MS-DOS compatibility and its still small software library (three packages, Macwrite, Macpaint and Multiplan, at the time this article was written). Time and software may change the balance point here.

The future clearly holds a mixture of workstation products. A large part of that heady mix is sure to be personal computers. If we can work out the process that permits us to provide system-level function to these useful and relatively inexpensive workstations and a standard interconnect environment — or perhaps a choice of several — we will arrive at the automated office much sooner than we had dared to hope. OA

Wohl is president of Advanced Office Concepts Corp., a consulting firm based in Bala Cynwyd, Pa.

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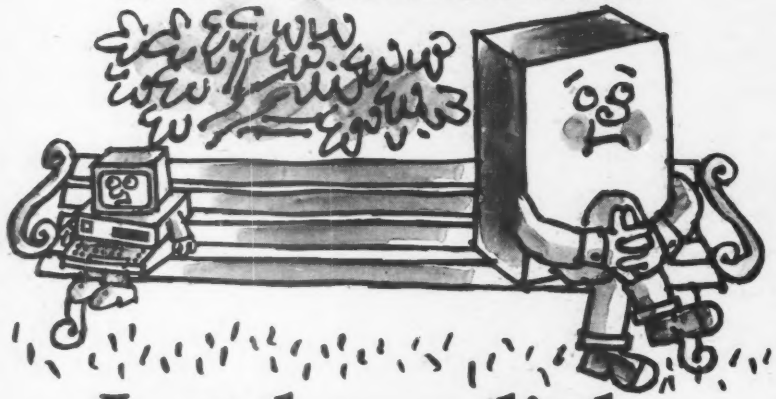

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PBX TECHNOLOGIES

By Angela MacRae

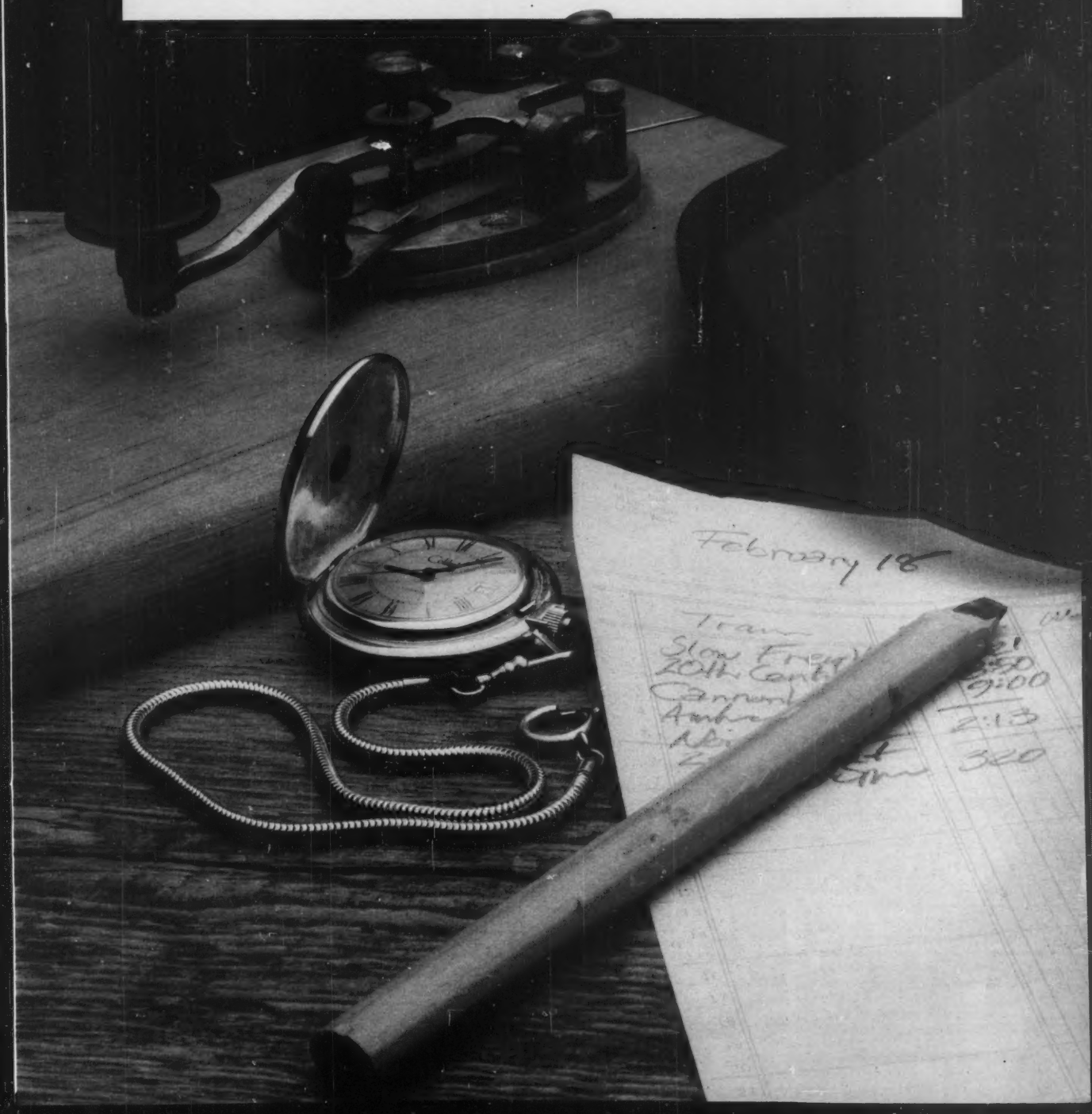
Within the past few years, vendors of data processing, telecommunications and office automation technology have been competing to supply multipurpose systems to the office.

Until quite recently, however, telecommunications vendors had not been very keen competitors in bringing integrated systems — those that handle voice, data, text and image — to the office environment.

Most telecommunications vendors now offer digital switches. The digital private branch exchange (PBX), with expanded switching and processing power under an enhanced architecture,. can handle information in virtually any form over standard twisted-pair wiring.

While end users wait anxiously for a single workstation that combines the functions of all office equipment, telecommunications vendors are positioning their products to evolve into the vehicle of office communications in the information age.

The most pressing problem



in managing information is integrating and interconnecting the installed base of systems and devices in the office. The immediate challenge is to help businesses make the best use of their current equipment and prepare for the more powerful, more dispersed and more flexible systems of tomorrow.

Word processing and the proliferation of data terminals and personal computers throughout the office is making information handling an increasingly complex and even chaotic task. Electronic keyboards are connected to a variety of micros, minis and mainframes. Wiring systems connecting terminals are complex, and the languages in which these devices talk are so varied that communication is often difficult or impossible.

It's not uncommon to find a professional-level knowledge worker — an analyst in a large financial corporation, for example — with a number of devices on his desk: a 3270-type terminal to access mainframe applications, a dumb terminal connected to the corporation's electronic mail system and either an asynchronous Ascii-type terminal or a personal computer, if the higher cost can be justified.

At the same time, many other white-collar workers still do their jobs with the same tools used by generations of their predecessors: pencil, paper and telephone. Clearly, the widely proclaimed benefits of OA have been only partially realized.

This situation presents a perfect opportunity for vendors to address present and future applications simply by enhancing today's ubiquitous telephone set as an integrated voice and data workstation. What users need is a device installed via twisted-pair wiring that is a cost-effective alternative to both a telephone set and a separate data terminal. PBX vendors providing such a single device will have the competitive edge over DP and OA vendors installing separate devices and additional wiring systems.

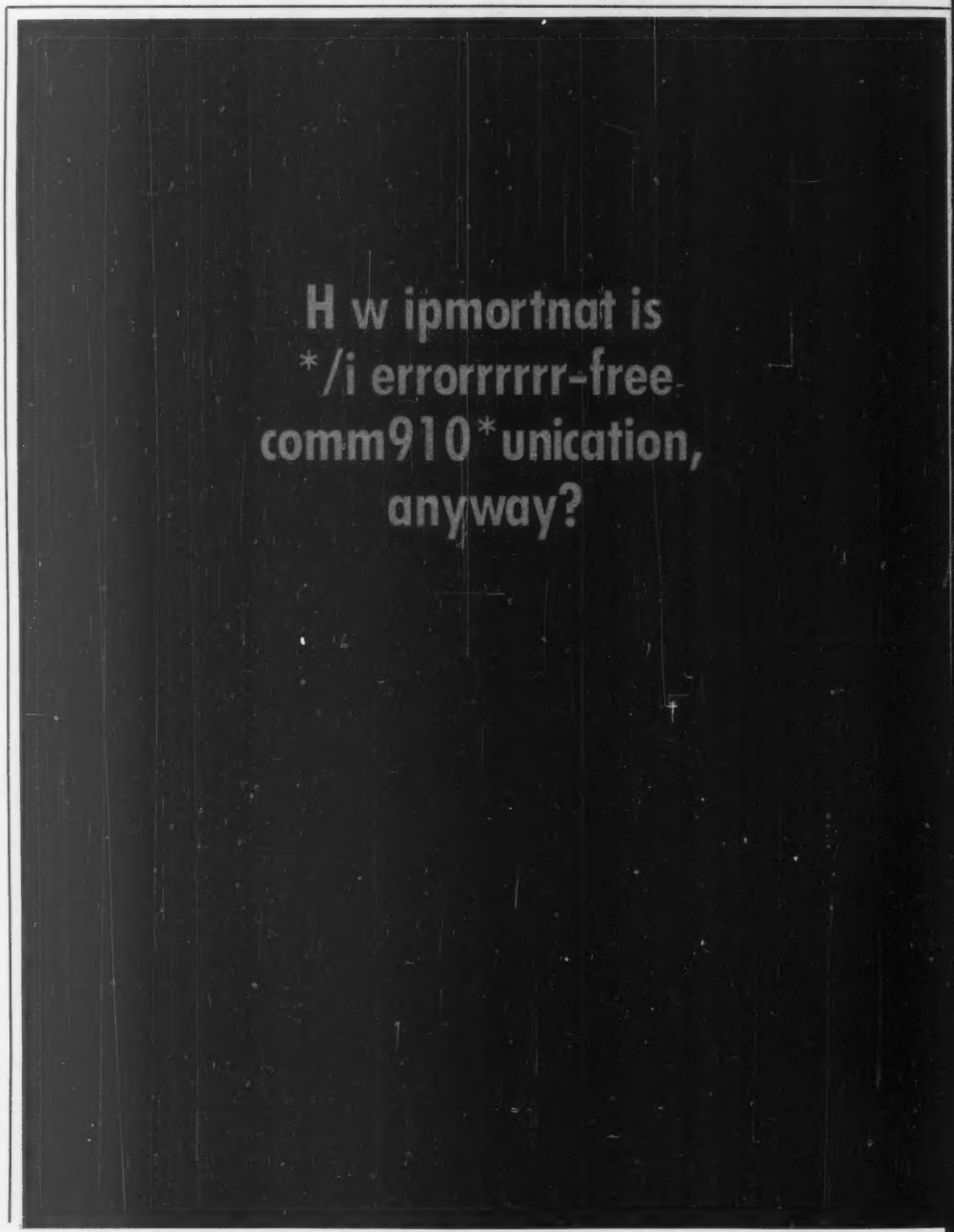
The PBX vendor follows tradition in bringing integrated compatible technology to the office. As the telecommunications industry evolved over the past century, it adhered to universally accepted standards. Hence, any approved system — regardless of where in the world it was produced or when it was developed — can function as an integral part of the communications network.

The more recent evolution of the DP and OA industries has been less orderly. PBX vendors are well-positioned to work with software specialists and organizations concerned with DP standards to provide products that will allow users of existing equipment to integrate and interconnect their hardware. In fact, vendors from all three industries are beginning to work together to set standards: Witness the trendsetting moves toward industry integration by Digital Equipment Corp. and Northern Telecom, Inc., and IBM and Rolm Corp.

The distinctions among telecommunications, DP and OA are blurring. They are blurring across applications and features. They are blurring among the various media. And they are blurring between devices, as single-function desktop telephones and terminals give way to a range of multifunction desktop devices combining voice and data. This merging of technologies will result ultimately in the development of a multipurpose system that handles voice, data, text and image. And this integrated system will derive from the evolution of PBX enhancements. The foundation for this evolution is already in place. The first generation of integrated voice and data terminals is giving way to more enhanced versions. The forthcoming applications on the PBX are well beyond the infancy stage. Although users have yet to see the first portable, attache-type terminal with associated telephone set, surely it is on the way.

PBX vendors are most experienced in the area of voice communications and only more recently in data communications. As a result, applications that evolve out of PBX technology will begin with enhancements to the voice-based service — for instance, conferencing and voice messaging. Integrating the services and media that the PBX can now switch digitally will be the first major change in software offerings. The add-on voice messaging system currently prevalent will be only one of many services offered as part of the PBX. Multimedia messaging — combining voice, text, data, graphics and image in one messaging envelope — will come with changes in software architecture.

The PBX' strong voice-switching capabilities provide for major developments in voice messaging systems and multimedia conferencing. The enhanced PBX will also handle and process multimedia documents — text, data, graphics, image and voice in a single document. On-line documents



can then be distributed much like electronic mail. Protocol converters will allow documents from dissimilar systems to be gathered into a common format for editing.

Combining multimedia documents will certainly increase efficiency and productivity. It will also greatly reduce the possibility of error when a document goes through a number of versions and then in turn is transformed from one medium of exchange to another and another — and back again. With integrated PBX-based document processing, a professional can key in the document or information, using support staff to edit the draft and do final formatting. The document then can be distributed directly to any number of remote locations in an organization by means of the enhanced PBX system.

In short, unlike the previous experience with OA, where separated services were offered through discrete systems, evolving PBX systems will offer a set of distinct yet interconnected services.

Several possibilities are presented by the evolution of enhanced PBX systems:

• Electronic filing for a multimedia system. The traditional tree-structure of filing systems for individuals, project groups and functional units will have the added complexity of filing required for different media. For example, voice compression techniques will be required for documents containing both text and voice information. Key factors in filing systems will be high flexibility with leads or pointers to information in different locations.

• Development and processing of interactive forms. Because of the PBX' messaging capabilities and use of the on-line PBX directory, performing these functions will be far more realistic than on OA systems. Automatic routing of a form to a predetermined list of recipients tracks the form. Automatic calculation and autogeneration of periodic reports from compiled forms will greatly improve efficiency.

• Integration and interconnection for PC users on two levels (the physical link and the applications accessed). Switching a PC to the outside world via the PBX requires the development of interface circuitry to the PC. Once done, however, the interface eliminates the expense and inconvenience of modems and RS-232/coax connections. The PC can communicate over twisted-pair wiring to the closest wall jack, like any telephone set attached to the PBX.

On the applications level, PBXs will be running popular microcomputer operating systems treated like another software application. This will allow PC users to execute programs centrally on the PBX-based configuration, and to have these PC applications integrated with other multimedia applications developed for the PBX. Thus, users who can access the PBX-based applications will also be able to use the PC applications without the expense normally associated with the typical stand-alone PC configuration.

• Speed, code and protocol conversion features (now offered via add-on black boxes) available as an integrated function of the switch. This will increase the efficiency and ease of integrating systems.

• Interfaces to other vendors' coax local-area networks and X.25 gateways to public and private networks. Autocall, auto-login and auto-service-select for remote processors will improve user processing power and access to other systems. Freedom to access and process information from many systems according to one's needs and schedule will surely enhance productivity, creativity and the general quality of working life, but these tasks are very much dependent on the operational simplicity of the system. The structure is in place, however, to provide a uniform interface across applications.

PBX evolution is not without its inherent problems. Numerous intermediate stages will take place in this evolution — for example, when an add-on service is integrated with the switch and users are obliged to wade through the complexities of the changeover.

The enhanced digital PBX will evolve into the communications hub of the office. It will bring to users enhanced multimedia communications solutions. The integration of media applications and the interconnection of various systems and devices are evolving realities. We will see more and more high-technology vendors delivering multipurpose systems and devices for the office as users demand more from technology.

The result will be an increased ability to access, process and manage information. And that will lead to increased profitability. OA

MacRae is manager, product application analysis, in the Integrated Office Systems unit of Northern Telecom, Inc., in Dallas, Texas.

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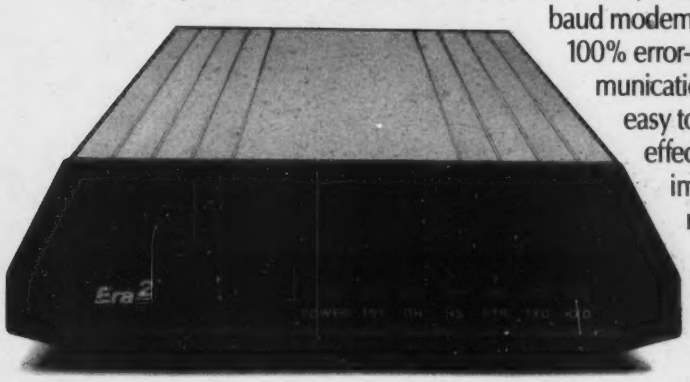

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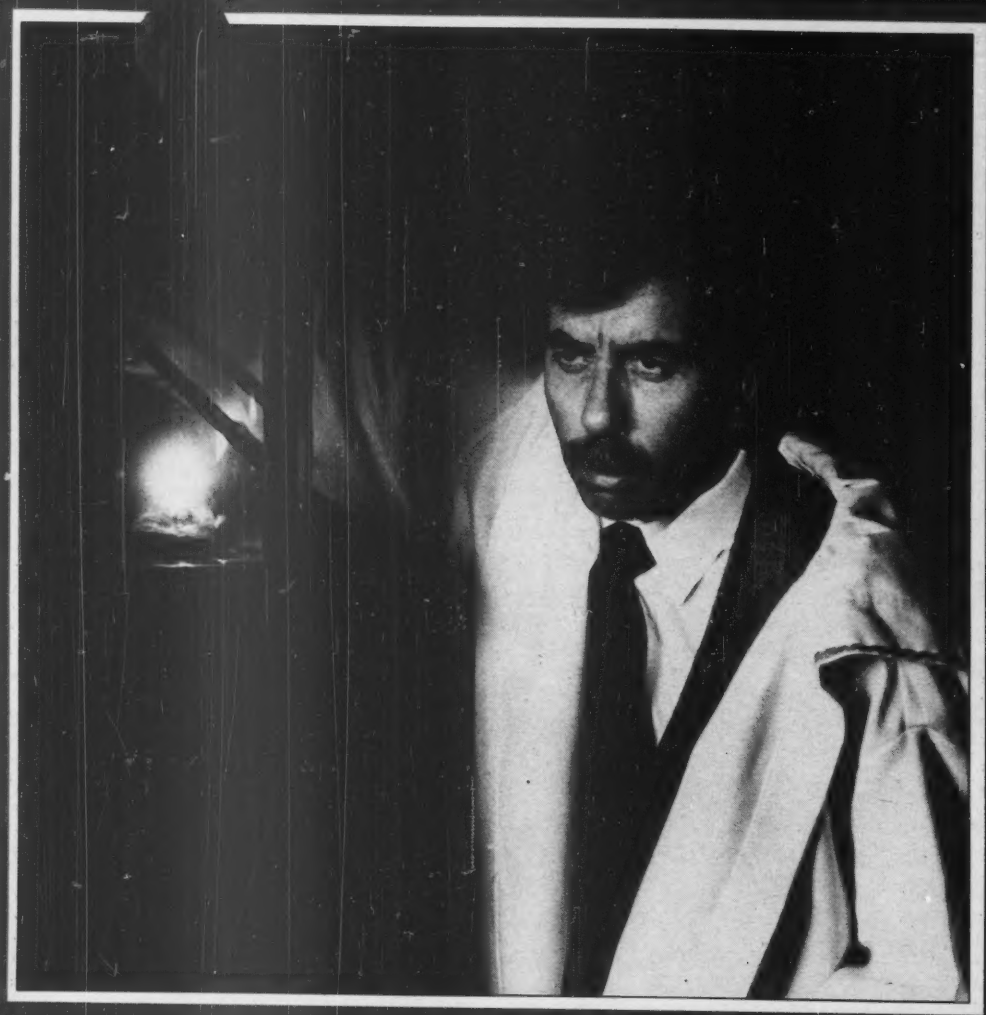

The Search For The Perfect Spreadsheet

By Thomas Zappia and Thomas O'Flaherty

The evolution of spreadsheet software packages has created an interesting paradox: Many features that make spreadsheets attractive also limit their capabilities. With the increasing use of spreadsheets, these limitations will become more apparent. Users should acquaint themselves with both the power and the limitations of spreadsheets.

Spreadsheet packages exist for all types and sizes of computers — personal computers, minis and mainframes — but those designed specifically for personal computers have attracted the most attention. These packages tend to fall into three categories:

- Classic spreadsheets like Visicorp's Visicalc, Perfect Software, Inc.'s Perfect Calc and Microsoft Corp.'s Multiplan.
- Integrated packages, for example, Lotus Development Corp.'s 1-2-3 and Context Management System, Inc.'s MBA.
- Integrating software, such as Visicorp's Visi On and Quarterdeck's Desq.

Although early PC spreadsheet packages offered only a single function, later packages have combined more functions, such as data base management, word processing, graphics, telecommunications and windowing, around the basic spreadsheet.

It is easy to see that various combinations of the above features alone would result in quite a number of different products. If com-

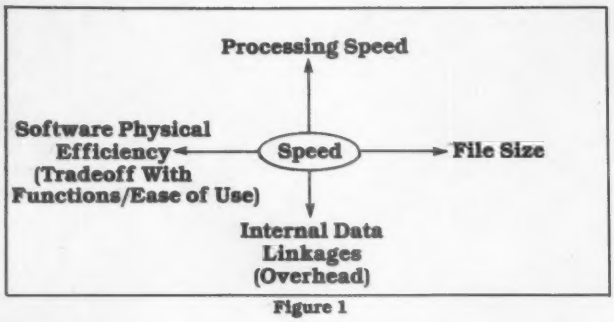

Figure 1

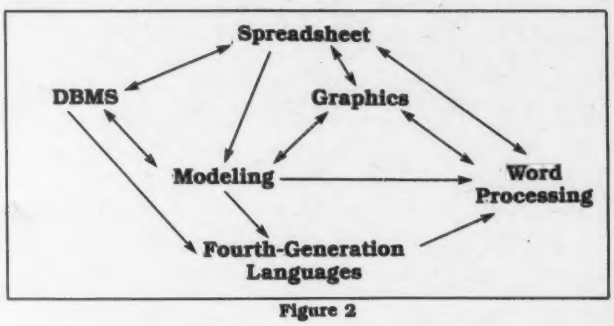

Figure 2

parisons are then made for each product's data base size, arithmetic functions, WP features or any other internal characteristics, the number of such products reaches into the hundreds.

In spite of the wide choices, however, for two reasons it is very unlikely that any single package will meet all of a user's needs. First, no package currently on the market offers all the above features; even after buying an integrated spreadsheet package, users are still left hanging. Visicalc, for example, offers only a spreadsheet; 1-2-3 provides spreadsheet, data base, graphics and WP; MBA provides spreadsheet, data base, graphics, WP and communications; Visi On offers windows, spreadsheets, data base, graphics and WP. Users who buy any of these packages for what they do offer could find themselves wanting the options the packages don't offer. This may not happen immediately, but it is likely to occur in the future when needs change and mature.

Second, regardless of the level of experience, the user will soon stretch each feature of the package to its limit. This tendency is most obvious in the spreadsheet's data capacity. Users quickly find the spreadsheet's capacity limited, particularly when compared with data base management systems.

One frustrating feature is the inability to separate data, modeling and reporting capabilities within a spreadsheet. For example, the relationships specified in the spreadsheet will operate only on the data within the spreadsheet. Those relationships cannot be applied to data residing elsewhere unless that data is reentered. Report generation is also limited to the existing structure of rows and columns of the spreadsheet. Very little flexibility exists to change a report after the spreadsheet has been set up. More problems are encountered when users run into a common business requirement — consolidating financial statements.

Many users are so amazed by the spreadsheet's capabilities that they overlook what may be an even more important consideration — data. These users build fairly sophisticated models and applications with spreadsheets; later they find that the data they need is not available or, if available, does not exist in the right form or in sufficient detail.

Emphasis has been placed primarily on what spreadsheets can do for the user, not on what the user and others must do before the spreadsheet can be utilized. Even when data is available and is in the proper format, the user must usually manually enter the data. Downloading data from existing corporate data bases (when this capability is available) often eases the problem of data availability and entry. However, it does so at the cost of forcing PC users to have a knowledge of existing mainframe systems' hardware architecture and data structures.

In addition, this concept of downloading data presents another area of concern. Spreadsheet packages continue to emphasize the benefits of integrated software with linked functions. A change made to data in the data base is immediately reflected in the spreadsheet and graphics. If a windowing capability is provided, the user can view the change in all three functions simultaneously. For now, these links are local to the particular user's personal computer. With the evolving micro-mainframe hookup, users will want these links to extend from the PC to the mainframe.

This capability will raise many questions about data integrity, security and control; most of these questions do not yet have satisfactory answers.

As discussed earlier, spreadsheets cannot meet all of a user's requirements, either because of lack of particular functions or because of the limitations of available functions. As a result, available functions are subject to misapplications — one admittedly extreme example is the use of a spreadsheet for word processing. Misapplication often occurs when users lack either the knowledge or availability of proper tools. The area of personal computers in general suffers from an overall lack of systems planning. One result of this vacuum is that users often cannot see the full range of their needs until after they purchase a spreadsheet package.

When users do gain some experience with spreadsheets, they tend to place much more importance on processing speed. They quickly become frustrated and annoyed at the length of time it takes to run spreadsheet models. Nevertheless, a clear tradeoff is made between integrated linked functions and processing speed (see Figure 1). The cause of this problem must be shared between the spreadsheet package, which is trying to provide more and more functional capabilities, and the inherent limitations of a fully exercised personal computer.

Spreadsheets provide sufficient capabilities to let users build fairly complex models. But when those models become more complex or are shared, the lack of any self-documenting capabilities within the spreadsheet will lead to confusion about what the model is doing. Other users will find it difficult to understand or to modify the model.

Despite all their shortcomings, spreadsheets have proven to be very powerful tools for business applications, particularly for ad hoc model building. PC spreadsheets provide excellent price performance, so long as users are aware of their limitations.

However, more experienced users can find more powerful tools in modeling packages, such as Express and IFPS; fourth-generation languages; downsized minicomputer packages; and the new supermicros (see Figure 2).

More powerful hardware — such as supermicros or 370s on a chip — may eventually ease some of the limitations, but they will not eliminate them. OA

Zappia is senior consultant and O'Flaherty is principal research consultant at Input, a consulting and research firm in Saddle Brook, N.J.

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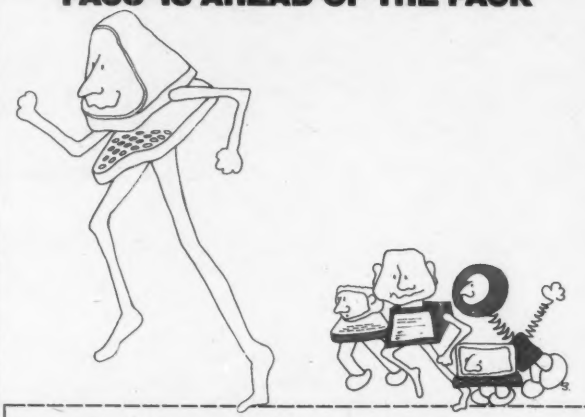

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RICH TENNANT

The Quest For Compatibility

By Glenn Rifkin

The term "IBM PC-compatible" has recently become as much a warning signal as an enticement. "It's caveat emptor — let the buyer beware," Jack Karp, the Gartner Group's director of personal computing services, noted.

When the issue of IBM Personal Computer compatibility was first raised, a laundry list of features and functions were required before a machine got the stamp of approval.

Today, according to Future Computing, Inc. of Richardson, Texas, IBM PC compatibility, although it is a complicated issue, can be measured by one easy test: Does the machine in question run all software intended for the IBM PC right out of the box?

With an estimated 3,000-plus software programs available for the PC, the chances of any single machine being 100% PC-compatible are virtually nil. That, however, doesn't mean it's IBM or bust. A variety of personal computers on the market are close enough to provide a choice. It seems that compatible personal computers are becoming like bellybuttons: Everbody's got one.

For the corporate user, the issue is now twofold. The first question is to find out if the product is indeed PC-compatible and to what extent; the second question: Does it really matter?

Clearly, the IBM PC dominates the marketplace and has spawned an entire industry for third-party software developers. But industry analysts are not convinced the PC is the best offering around in terms of price and performance. Other major vendors have personal computer products with more power and versatility, comparable or better pricing and enough software offerings to satisfy most needs. What they don't have are three large blue letters that seem to spell automatic acceptance.

While the issue of PC compatibility has proven frustrating for some vendors, others are taking an "if you can't beat em, join em" approach. According to Ron Ward, executive vice-president of Future Computing of Richardson, Texas, more than 50 vendors claim to have products that are PC-compatible. Because none can legally be totally compatible, a testing center

at Future Computing has developed a set of conditions that must be met for real compatibility.

One basic requirement is that the machine run Microsoft, Inc.'s MS-DOS operating system. Unfortunately, running MS-DOS does not ensure compatibility. Many machines are functionally compatible — they use one of the Intel, Inc. 8088 or 8086 microprocessors and can read and write to IBM PC disks. But this again doesn't guarantee compatibility. Truly operational compatibility is tough to achieve and it comes in a specific form.

Future Computing asks three questions:

- Does the machine run, right off the shelf, software intended for the IBM PC?
- Can it use add-on boards designed for the PC?
- Can it use peripherals, such as modems and printers, designed for the PC?

Currently, five companies' products have passed Future Computing's tests: Compaq Computer Corp.'s Compaq Portable and Compaq Plus; the Columbia Data Products, Inc. MPC; the ITT Courier Terminals Systems, Inc. Xtra; Seequa Computer Corp.'s Chameleon; and Panasonic Co.'s Senior Partner. According to Ward, several other machines will probably make Future Computing's list, but are either still being tested or have yet to be tested. Among the probables are the Colby Research Industries, Inc.'s PC; Electro Design IMP-12; OSM Computer Corp.'s PC; Visual Computer, Inc.'s Visual Commuter; Televideo Systems, Inc.'s TPC-II; and Tava Corp.'s PC.

Several other companies believe they also belong on the list, but Ward pointed out that although some vendors believe they have achieved compatibility, they have fallen short in one area or another.

"Running one software program, such as Lotus 1-2-3, is not necessarily an accurate test," he explained. "For example, the Bytec Hyperion could run the spreadsheet portion of 1-2-3, but it could not handle the graphics."

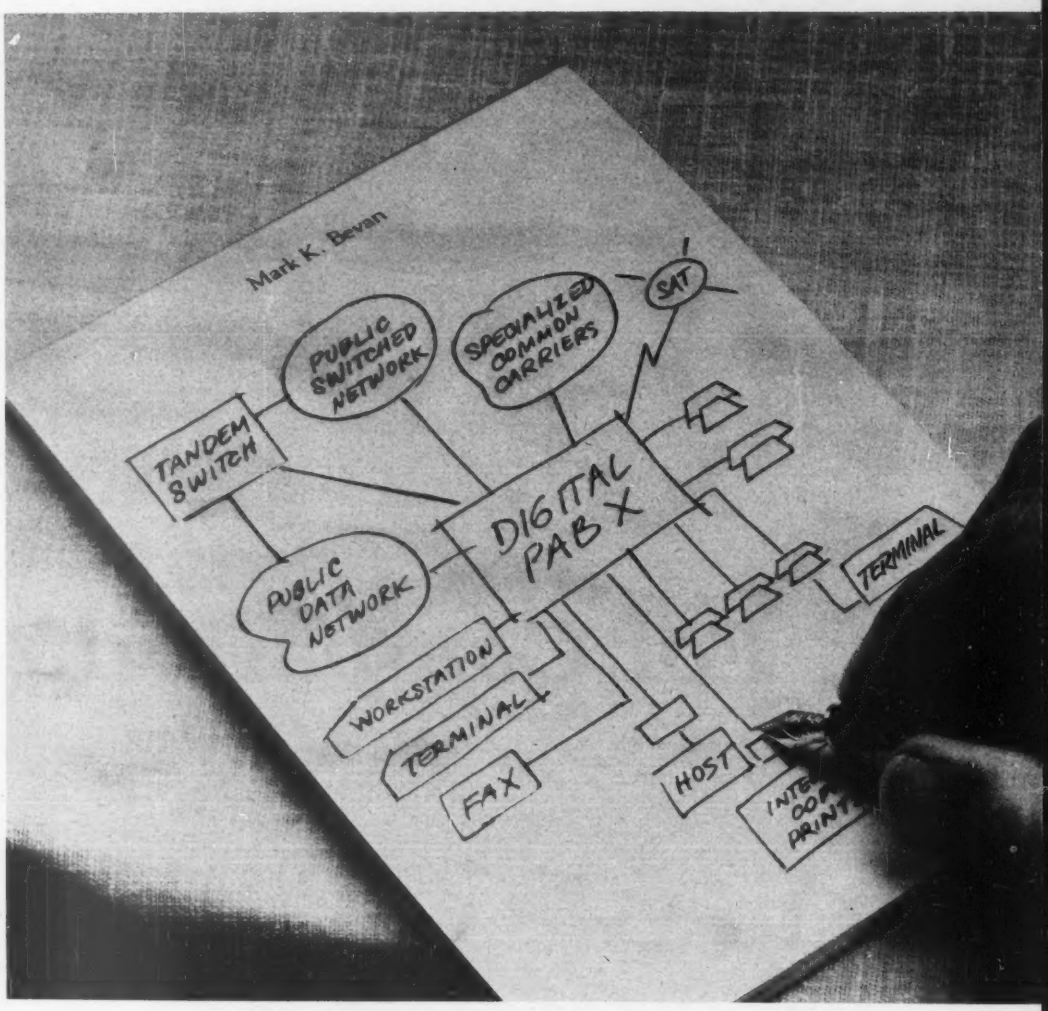
The key to the puzzle is the basic input/output system (Bios). Bios, a software layer built into the hardware, controls such functions as keyboard, video display, disk drives and other peripherals. IBM copyrighted its Bios; therefore, a compatible maker must create a Bios that essentially does the same thing but differently.

To further add to the confusion, PC-DOS, IBM's version of MS-DOS, was inadequate, according to Ward, because it did not provide a complete interface to the machine's hardware. As a result, third-party software developers had to circumvent the Bios to allow their products to handle certain fundamental commands like cursor control or copy protection.

What that means is that all software developed for the PC is tied inextricably to the PC hardware, Ward said, and "compatibles are heavily dependent on the PC architecture. That's why just running MS-DOS doesn't mean compatibility."

Several vendors have already had their hands slapped by IBM for copyright infringement on the Bios. Corona Data Systems, Inc., Eagle Computer, Inc. and Handwell Corp. have all agreed, in out-of-court settlements, to redesign their Bios. "IBM is not in the business of making its products easy to copy," Gartner Group's Karp said.

Despite the difficulties in achieving compatibility, new vendors keep trying. Within the last few months such manufacturers as Sperry Corp., Docutel/Olivetti Corp., North Star Computers, Inc., Kaypro Corp., Zenith Data Systems Corp. and a start-up company called Mind-



It used to take six different companies to build a communication system like this.

Now it only takes one.

set, Inc. have all announced IBM PC-compatible products. In hopes of grabbing a chunk of the market, all offer varying degrees of PC compatibility as well as additional features, such as more speed, memory, graphics and so on. Even those vendors that have been rebuked for copyright infringement have stuck to their game plans. Eagle reportedly never stopped shipping its product while it modified its Bios.

Of course, beyond the issue of legality, consultants question whether the degree of compatibility is all that crucial. According to Karp, "If it gets the job done, fine." He also noted, however, that it's important for buyers to become educated and know what they're getting involved in.

Ward added that several vendors have marketed products they actually believed to be compatible, but that, in fact, fell short. "End users weren't being defrauded; the vendors thought they had a compatible product, but they really lacked knowledge of what compatibility meant."

Another issue is how favorably the compatibles are being looked upon by the corporate world. Though Future Computing credited IBM PC compatibles with grabbing up to 40% of the personal computer market, it was not clear how much of that occurred in the Fortune 500 environs. According to Anne Mayfield, a senior analyst for Arthur D. Little, Inc., most corporations are opting for the IBM PC itself rather than going out on a limb with a "me-too" vendor.

Karp pointed out that the hotly debated shakeout among PC compatible makers may begin now that IBM appears to be getting "very aggressive" and is getting into many unregulated markets. IBM's unveiling of its portable PC as well as increased competition from the Japanese is expected to put tremendous pressure on the compatible vendors. Karp predicted that price cutting, which will be one way to combat IBM, will hurt the competition badly: "There's only a 10% to 15% profit margin on personal computers. As that gets squeezed, the profit margins must come down. That could mean trouble."

"End users weren't being defrauded; the vendors thought they had a compatible product, but they really lacked knowledge of what compatibility meant."

Seymour Merrin, president of Computerworks, a Westport, Conn., dealership, pointed out that among the key questions to be asked about PC compatibility is whether the vendor will even exist in a year or two. "That's no small matter," he stated. "I think the only one that will survive is Compaq."

Indeed, if Compaq is an example of what PC compatibility can mean, the market could literally be flooded. The two-year old Texas-based manufacturer started shipping its Compaq portable just over a year ago and now is reportedly the fastest growing company in U.S. business history. With first-year sales of more than $110 million, Compaq "is the only company accepted by all major corporations as an IBM PC alternative," Merrin said.

A survey by Future Computing of 107 of the Fortune 1000 companies confirmed Merrin's assessment. The buying pattern showed IBM Number One and the Compaq Number Two. Merrin said he believes Compaq's success is due to several fea-

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tures it incorporates and which the PC doesn't have, including portability, a high-resolution, monochrome screen and a built-in graphics card.

Compaq, according to Ken Price, the company's director of corporate communications, does extensive testing of software on the market and has published a list of more than 600 packages that run on both the PC and the Compaq without modification. In addition, Compaq's strategy has been to let the retail dealers act as their sales organization. This act of faith has led to more than 1,000 dealers stocking the Compaq.

Although IBM recently unveiled its own portable version of the PC, Compaq is not overly concerned. Price said Compaq's strong relationship with the dealers and the Compaq price, which is below that of the PC portable, will insulate his product from serious harm.

Ward said he believed there will always be room for competing machines in the marketplace because the dealers, like everyone else, simply don't want to become totally dependent on IBM. He also predicted IBM would never overdistribute the PC and that would always leave a channel open to others.

The compatibility issue has not affected hardware makers alone, however. Software manufacturers have reaped the benefits of the PC's popularity, but have also had to confront the confusion themselves. Fallout from the Bios controversy has forced software developers to modify many of their programs for individual machines, a process that obviously favors the biggest selling hardware. Buyers often base their hardware decisions on the availability of software, and from a software perspective, riding IBM's coattails is a must.

Lotus Software, Inc., whose 1-2-3 program is often cited as a worthy test for PC compatibility, has reaped the benefits of IBM's popularity. Chris Morgan, Lotus' vice-president of communications, said the compatibility question "is really a hardware issue.

"We're interested in the most successful machines," Morgan explained. "We'll modify our programs for any new product that we feel is worthwhile. It would be nice if all machines had the same interfaces and drivers, but they don't. It's a fact of life. There are different degrees of compatibility, but we take full advantage of any machine that we write our software for."

Karp pointed out that delays in software modification for a particular machine average from six to nine months, and the fastest selling machines get the software first.

As was the case with 1-2-3, software developers often create their programs on the PC, which automatically makes it first in line, and then proceed to other machines.

Despite the PC's unquestioned success, rumors have abounded in the industry that IBM intends to move away from the MS-DOS environment and create a proprietary operating system. Nevertheless, analysts agree it is unlikely that IBM would forego the mountains of software and well-established channels of distribution in order to shut down a few competitors.

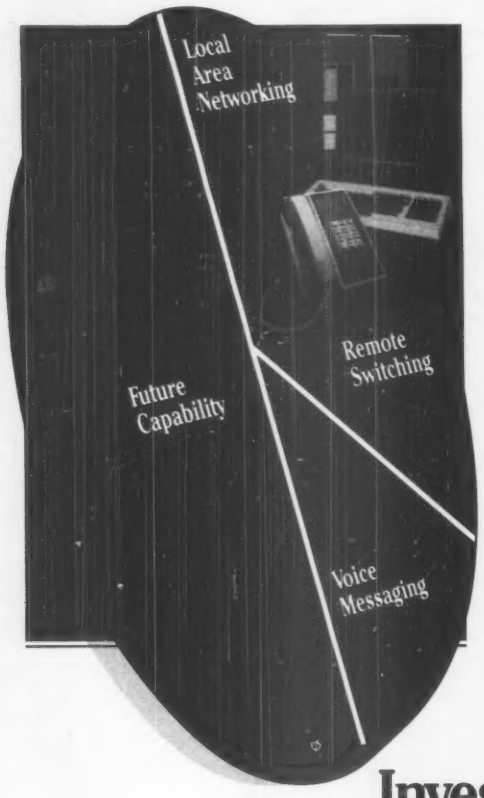
An IBM spokesperson stated that, although the company is always looking for ways to enhance its products, PC-DOS will remain part of the PC. Analysts such as Ward and Thomas Willmott, of the International Data Corp., view MS-DOS as an evolving system that will likely move toward more of a multiuser, multitasking environment. With IBM's impending local-area network on the way, a network interface for the PC will certainly be a requirement.

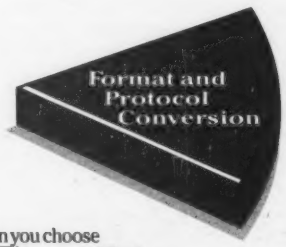
Much of what happens to MS-DOS could be a matter of the competition between Microsoft and Digital Research, Inc. (DRI). Willmott said he believes DRI, which created the 8-bit industry-standard CP/M operating system, is working on an umbrella operating system for multitasking and multiuser access that would allow MS-DOS to operate within it.

PC-DOS will remain somewhat stable on the PC because of the company's commitment to the PCjr, according to Karp, who predicted that in the long term, IBM will diversify its support of operating systems and possibly move to a proprietary one in which "guests" such as CP/M, Unix and others would work, along the lines of IBM's VM/CMS mainframe environment.

For now, most hardware vendors feel compelled to address the compatibility issue in one way or another. Apple Computer, Inc., for example, introduced its Macintosh computer with its own proprietary operating system. If Apple is successful, it might encourage more movement from IBM's sphere of influence. OA

Rifkin is senior writer at Computerworld OA.





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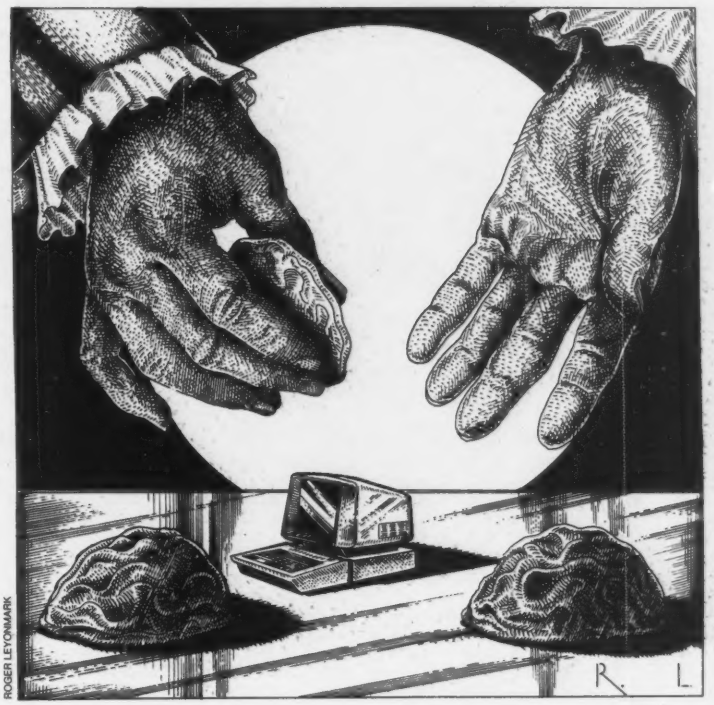
Picking A Winner

THERE ARE SOME NEW PLAYERS IN THE INFORMATION GAME — PROVIDERS OF ON-LINE DATA BASES FOR MICROS.

By Linda L. Winningham and Patricia Carrell


ROGER LEYONMARK

If you manage or oversee personal computing, office automation or information center services within your firm, you are probably aware of the recent explosion of external or remote data bases. Although on-line-data base access is not yet as popular as some personal computing applications (such as word-processing, spreadsheets and financial analysis, for example), it is emerging as a powerful application that is catching the eye of many personal computer users.

End-user data bases are growing even more rapidly than data bases intended for use by intermediaries, such as librarians or staff analysts. What this means to information managers is that they should begin assessing the many issues raised by access to these external data bases.

Among the issues that managers will have to deal with are selection procedures for external data bases, communications software, downloading procedures, cost-control over multiple users of data base sources, training and integration of internal as well as external information.

This article will highlight a few recent data base introductions and will discuss emerging trends. As these newer offerings are described, it will become clear that managers should begin to focus attention on the external data base environment, from a standpoint of both organization and control.

In the year or so, the most significant happening within the data base industry has been the new crop of business services aimed at personal computer users (especially IBM PC users). The objective expressed by vendors of these newer services is to broaden the market for their existing data bases. These new services come from all segments of the data base industry — real-time quote vendors, such as Quotron and Bunker Ramo Corp.; text-oriented vendors, such as Dialog Information Services, Inc. and Bibliographic Retrieval Systems (BRS); financial or analytically oriented vendors, such as Data Resources, Inc. and ADP Network Services, Inc.; and, finally, even consumer-oriented vendors like Compuserve, Inc. and Dow Jones News and Retrieval Service. These services all have some common attributes: more easily usable interfaces, more flexible pricing and distribution schemes and packaging that corresponds to the needs of specific business-user groups.

Among these newer services, Newsnet, Inc.'s Newsnet is one of the easiest to use. From its inception, according to Brian Raub, Newsnet's marketing director, the service was "specifically designed for the business executive." Although Newsnet contains the full text of 150 newsletters in 31 industry categories, the new user has to digest only a four-page system overview sheet before logging on. On-line menus are available, as is an 800-number customer-support service.

One Newsnet category is "Electronics and Computers," which contains *The Seybold Report on Professional Computing, Modem Notes, Mini/Micro Bulletin* and the *S. Klein Newsletter on Computer Graphics.* The "Office" category contains *Advanced Office Concepts and The Seybold Report on Office Systems.*

The primary users of Newsnet are middle to upper-level managers who subscribe to the service to stay on top of trends in their industries. They can monitor competitive activities — product introductions and plant closings, for example — for a fraction of the cost it would take to subscribe to all the publications covered within each industry category. They also subscribe because of Newsnet's Newsflash service, which automatically tags articles of interest to each user, according to predefined user profiles. Newsnet is available at a monthly minimum of $15. Hourly charges run between $24 and $48 during daytime hours, and at a $6 discount in the evening and on weekends.

Two new services from Dialog and BRS, although slightly more difficult to use, contain textual information similar to that of Newsnet. These services are Dialog's Knowledge Index and BRS' After Dark. The material contained in both services is abstracted, not full text, and is primarily from advertising-supported business periodicals. Both are subsets of their vendors' primary data base services and, as such, they are more difficult to learn. The Knowledge Index user, for example, must master search commands and Boolean operators. The training manual is about 60 pages long, and I spent an afternoon of study before attempting to use the system.

These services are available only during non-working hours, but they are offered at a substantial cost savings in comparison with the parents' regular services. For example, information retrieved from the Microcomputer Index on Dialog's regular daytime service would cost $48 per hour, compared with $24 per hour on the Knowledge Index.

Because of the hours of availability and the relative difficulty of use, these two services appeal to serious after-hours business and professional researchers. Many medical professionals, for example, are among those who use BRS' After Dark service. In an effort to capture a larger chunk of the end-user market, both vendors have plans for daytime services.

Acting as catalysts for some of the newer financial and numeric data base services, popular spreadsheet packages such as Lotus Development Corp.'s 1-2-3 and Visicorp.'s Visicalc are playing a major role.

Staff analysts in corporate planning, finance, investment and economics departments created analytical reports before the thrust of personal computers. Often these reports were done on dedicated terminals hooked up to large time-sharing or remote computer service firms such as DRI, Chase Econometrics/Interactive Data Corp. and ADP. These services continue to be expensive and, although they provide powerful software capabilities, they take a long time to learn. Special retrieval and modeling languages must be mastered, for instance.

With personal computers and off-the-shelf spreadsheet software, these vendors are making their data more accessible to far greater numbers of users. Probably the best known of these newer offerings is Visilink, which was a joint development between DRI and Visicorp. Available on the Apple II and the IBM Personal Computer, Visilink facilitates downloading DRI's information into Visicalc worksheets. DRI has cleverly packaged its data for this new service into what it calls Datakits. Purchasing the $250 Visilink software diskette and specifying a credit card number for billing allows a user to select a Datakit from among a number of prepackaged data bases or to retrieve a user-specified Datakit.

One example of a prepackaged Datakit is the Automotive Analyzer, which sells for $40 and provides statistics for determining market share on the number of automobile engines installed, by number of cylinders, for each of the top four domestic manufacturers. Another is the Company Financial Analyzer, which for $25 provides an income statement, balance sheet and ratio analysis for a single company for eight years or eight quarters.

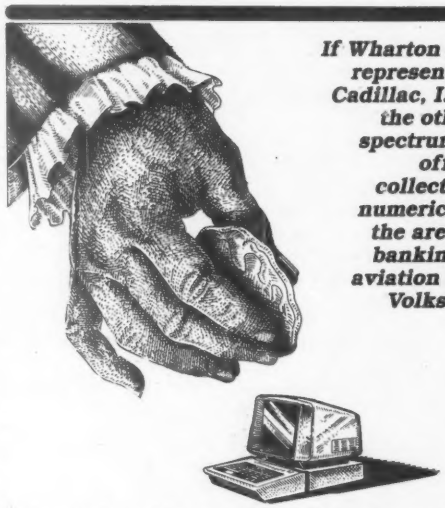
With its Datakits, DRI is accomplishing two ends. First, it is chopping its vast data base holdings into smaller, vertically aligned segments. Second, it is shifting its pricing away from mammoth charges based on a confusing projection of on-line-time usage, CPU cycles and number of data units to a fixed price based solely on the amount of data accessed.

ADP Network Services offers Data Path, a similar kind of spreadsheet capability which is particularly attractive to personal computer users involved in merger and acquisition analysis. Data Path was announced in May and costs $235. Like Visilink, Data Path is a data-access software package that works in conjunction with Lotus' 1-2-3. It facilitates the downloading of data from ADP's huge reservoir of U.S. and international economic, corporate, financial and banking data into 1-2-3 spreadsheets. It is particularly attractive for merger and acquisition analysis because of its powerful financial software coupled with the Compustat data base, one of the most popular sources for detailed financial information.

Similar in nature to DRI's Datakits, Data Path's Application Library allows business analysts and forecasters to choose an appropriate spreadsheet or report format. The data does not come prespecified, however, as it does in the Datakits. This may not be a problem; analysts seldom have exactly the same analysis needs.

ADP's pricing scheme diverges from that of DRI's. Besides the cost of Data Path — which includes three diskettes and a training manual — a monthly minimum of $100 is charged for maintaining an account with ADP. The actual amount paid for accessing ADP's data bases can then be either charged on a pay-as-you-go basis or (primarily for large ADP clients) negotiated according to projected usage. Usage is calculated based on $.02 to $.25/datapoint, $15/hour, plus $.027/computer-resource unit.

The obvious advantage of DRI's pricing is the upfront knowledge of access charges before logging on.



If Wharton Econometrics represents an industry Cadillac, I.P. Sharp is at the other end of the spectrum, claiming to offer the largest collection of on-line numeric data bases in the areas of finance, banking, economics, aviation and energy at Volkswagon prices.

Three other data base vendors, Wharton Econometrics Forecasting Associates, I.P. Sharp and Chase Econometrics/Interactive Data also compete in roughly the same financial, investment, economic planning and analysis area. Although their strategies differ, they are also realigning their data base services around the personal computer.

According to Ken Wing, Wharton Econometrics' marketing manager, that firm never wanted to be a large time-sharing firm. Accordingly, their data base access charges are part of an overall membership fee ranging from $10,000 to $25,000 per year, per service.

An example of a single service is the Quarterly Model Service, which provides forecasts of the U.S. economy. Besides access to data bases, the membership fee includes a certain number of days of on-site consulting, telephone access to Chase's staff economists and attendance at their Outlook seminars.

Because Wharton does not view its data bases as the mainstay of its business, it has chosen to adopt an extremely flexible distribution approach. Wharton will provide its data on computer tapes so that a client can load them onto an in-house computer; it will download its data onto a personal computer similar to the methods used by DRI and ADP described above; it will even provide its data on PC diskettes; and, of course, it continues to make its data available on a time-sharing basis.

If Wharton Econometrics represents an industry Cadillac in terms of offering a high price value-added service, I.P. Sharp is at the other end of the spectrum. That firm claims to offer the largest collection of on-line numeric data bases (more than 50 million time series) in the areas of finance, banking, economics, aviation and energy. Sharp offers all this data at Volkswagon prices, but includes little or no consulting. (DRI, ADP and Chase Econometrics/Interactive Data all offer consulting as part of their data base services.)

Micom, Sharp's personal computer offering, provides easy communications access to all Sharp's data bases. It allows the IBM PC to emulate a terminal for downloading. It then facilitates the transfer of the downloaded data into any spreadsheet package using the DIF format. (DIF, the format used by Visicorp, has become the de facto standard for spreadsheets).

Sharp's pricing, although it does not diverge from the industry norm of hourly-connect charges, is very reasonable. Only a few of its data bases involve royalty charges (charges which are extra, go beyond the hourly rate and are returned to the source publisher), and there are no subscription fees. The hourly rate is a fixed $60 for terminals operating at 30 characters per second and $120 for those operating at 120 characters per second.

Chase Econometric/Interactive Data offers PC Screen for downloading data into Lotus' 1-2-3 from its many financial and economic data bases. According to Pratt Harris, who is responsible for systems development at Chase, this offering will be enhanced in the future to allow for very flexible formatting. Chase is not assuming users will be happy with the fixed-format capabilities of standard spreadsheet packages (using Dif, for example) such as Lotus DIF 3, Visicalc and Multiplan. Instead, Chase believes users will want greater latitude in creating individualized reports from their data, and the firm is currently developing a capability for data format interchangeability.

These are only a very few of the many data base announcements that have zeroed in on the personal computer during the past year. Other new services of note from Dow Jones, Compuserve, The Source, Electronews, Mead Data Central, Disclosure and Compustat are beyond the scope of this article.

Lenn Bergstrom, vice-president at Real Decisions Corp., a Stamford, Conn.-based consulting firm, offered one way to make sense of these new services. The

external data bases of the '80s share many of the same characteristics with the computers of the '60s, according to Bergstrom. They are large, no one needs a whole one and they are incredibly expensive to maintain.

He predicted the following trends:

- Vendors will continue to recast their services in an attempt to capture their share of the rapidly expanding base of personal computer users.
- They will begin to stress their network capabilities by offering electronic mail and other value-added network services.
- They will develop more powerful, easier-to-use software.

Another way to look at data base trends was offered by Anne Caputo, a visiting assistant professor at The Catholic University of America and a Dialog trainer. Caputo pointed out the importance of ease of use to the future growth of end-user services. Most users cannot be expected to learn more than a few access methodologies or retrieval languages, she said, and industry consolidation will have to take place. The aim will be to make the user interface as transparent as possible. The possible result will be only a handful of very large vendors that provide common interfaces across their data base holdings.

Another trend that is clearly under way is that various data base vendors will be crossing traditional lines. So-called data base vendors, such as Dialog, will be moving into the domain of the numeric. The opposite will also be true; vendors like ADP can be expected to offer more in the way of textual services.

Full-text data bases, such as those offered by Newsnet, will also become more predominant. If managers are to use the services themselves, they want to be able to read the full text of articles retrieved, not just their abstracts. They certainly don't want to wait the several days currently required before an article is delivered.

As all these trends unfold, the message to managers of personal computing, office automation and information centers is that they will be subject to increased pressure from both users and upper management to become knowledgeable about these burgeoning data base services and to take control of them.

Information managers will need to assess, for instance, whether it is cost-efficient for all of their personal computer users to have individual passwords and separate subscriptions to each data base in use within their organization, or whether it makes more sense to download certain segments of data base offerings onto a mini for shared departmental use.

Another question will be who should decide which data bases are the most appropriate for in-house acquisition? In the future, it may not seem strange for corporate librarians to sit down with members of OA and management information systems departments to draw up a joint plan of a firm's external data base resources.

Finally, it seems clear that information managers should broaden their perspectives of information resources. They should recognize the value of integrating external data bases into their firms' existing management information systems. They should also begin to take an active role in assisting end users to take full advantage of these new data base services. OA

The message to managers of personal computing, OA and information centers is that they will be subject to increased pressure from both users and upper management to become knowledgeable about these services and to take control of them.

Winningham is president of Osprey Information Corp., a Princeton, N.J.-based consulting firm that specializes in the areas of personal computing and online data base access.

Carrell is an independent OA consultant in Wharton, N.J.

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KENNEDY SPACE CENTER LAUNCHES OA

BY GLENN RIFKIN

The moment is historical. The sleek Space Shuttle *Challenger* glides in over the palm-dotted landscape and touches down on the Cape Canaveral runway. For the first time, the shuttle is landing at its launch site, marking one more leap forward in the U.S. space program.

In 1984 there will be no fewer than nine shuttle missions. Although several years behind schedule, the shuttle program is now reaching its potential. The days of regularly scheduled space flights (quite possibly with private citizens aboard) are apparently not far off.

The increased number of launches has turned Kennedy Space Center into a beehive of activity, busier than at any time since the Apollo moon missions of the 1960s. As shuttle missions proliferate, the 2,000 civil servants who populate the center need faster, more efficient information flow. With this in mind, the center has initiated an extensive office automation program, which promises to be no less complex to complete than a shuttle launch itself.

The National Aeronautics and Space Administration (Nasa) has been an innovator in computer usage since the space program got under way more than 25 years ago. In the early 1960s, Nasa brought in vast amounts of Honeywell, Inc. equipment, and that vendor has dominated launch-related computing ever since. As the space program heated up, particularly during the Apollo era, nonlaunch-related computing began to mushroom. Since then, diverse systems have popped up in every quarter of the facility for support of business and information services-type applications. Unfortunately, those systems have traditionally been stand-alone, noncompatible equipment that actually contributed to the paper flow.

What the space center would like to accomplish is simple enough: to eliminate, or at least control, the tidal wave of paper that washes over the 140,000-acre facility. The complexity and sensitivity of the work done at Cape Canaveral — combined with the everpresent government bureaucracy — have resulted in paperwork that traditionally has been a labyrinthian obstacle to space center workers. As Roy E. Lealman, manager of the Kennedy Data Management Systems Division (KDMS) put it, "During Apollo, we used to say that if all else failed, we could climb to the moon on our stacks of paper."

In addition, Nasa plans to keep the size of the center's civil service work force relatively stable and, with the pressure of increased launches, worker productivity has become a key issue.

Dallas K. Gillespie, deputy controller of the Kennedy Space Center and leader of the Office Automation Task Team (Oatt), was asked to look into productivity at the center and to "beef it up." It has become clear to Gillespie that newer and better computing tools are needed to support the effort.

"We are here to get the shuttle in the air," Gillespie pointed out. "We have to make use of these new tools or we won't be able to handle the work load. You can't launch 18 shuttles a year using pencils and paper."

"Each launch is unique," added Georgia Brock, project manager for OA. "With turnaround time decreasing, there is a need to move information faster to accommodate each vehicle. We're under a lot of pressure to do more, better."

To this end, the center established Oatt in early 1983 to create a comprehensive and structured OA policy for the center. Oatt will also, after thorough investigation, provide the data necessary for

Nasa to make recommendations on a single vendor to install a state-of-the-art, integrated OA system for the entire Kennedy Space Center operation.

Because of government regulations on procurement, the process of bringing in a vendor must be subject to open bidding. Although this process allows task team members to get a good view of what is on the market, it also considerably lengthens an already complicated procedure.

Cost-justification is a major consideration in the procurement process. The automators at the center found very few quantitative studies on cost-justification, Gillespie said, and they realize their proposals will be scrutinized on several levels up to that of the General Services Administration.

In January, Oatt sent an open invitation to vendors to show their products to the team. After they collect data on available systems and potential uses, a centerwide source evaluation board will look over the data and make recommendations to a Nasa selecting official in Washington, D.C., who will choose the vendor. Gillespie estimated implementation would begin sometime in late 1984 and would take 18 months to complete.

His goal is to eventually have 1,000 workstations in place around the center as a fully compatible system with communication linkups to data bases at the space center. He anticipated that all managers at the center would be tied into the network to some extent and that substantial numbers of them will have personal computers on their desks. Among the expected applications are electronic mail, scheduling and personal resource aids, a Kennedy Space Center automated decision support system, a center action tracking system and a centerwide menu support system.

Though the search for a single vendor-integrated system is only now being undertaken, Kennedy Space Center is no stranger to OA. The center has had widespread word processing systems since 1976 and personal computers have been used extensively for four years. There has been timesharing on a wide variety of minis and mainframes around the base. In addition, a major pilot program involving Datapoint, Inc. workstations and Northern Telecom, Inc. Displayphones was implemented in 1983 and has proven highly successful on the executive level.

The campus-like facility has also implemented a growing data communications network with local-area networks in place in several of the center's eight major buildings. According to Larry Grimes, senior systems engineer for communications, a large-scale integrated data network implemented in conjunction with the proposed OA system is in its final planning stages, and Kennedy Space Center foresees a state-of-the-art telecommunications system in place in the next two years.

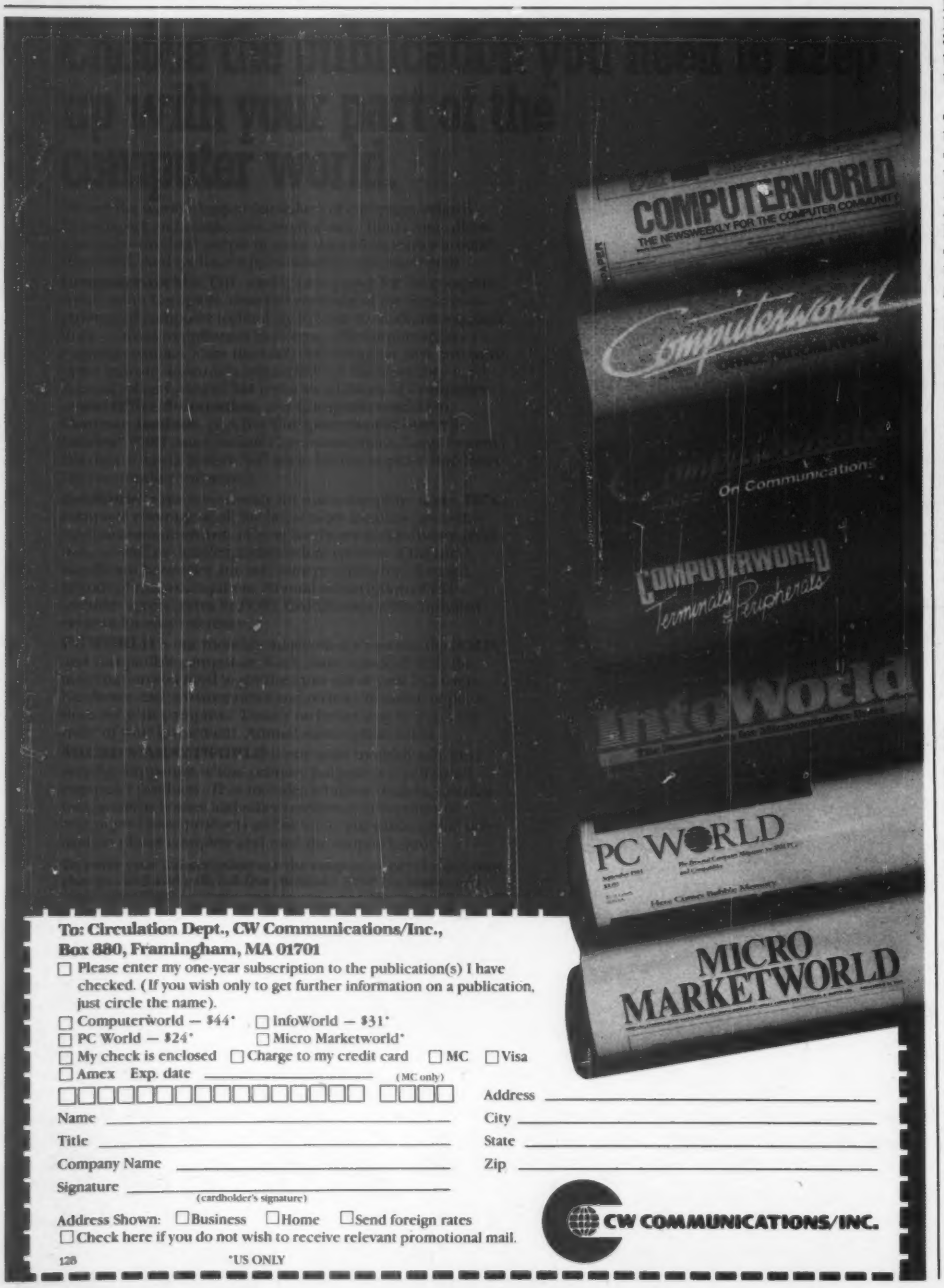
Besides Gillespie and Lealman, other key figures in automating the center facilities are Jim Akin, chief of the computer services division; Brock, an assistant to Akin; and Ed Odisho, a systems analyst in the Computer Services Division. Odisho was WP manager during the 1970s until WP ceased to be a separate function and began to merge with DP.

Odisho, who now serves as an internal consultant for acquiring OA equipment, said he has seen vast changes at the center in terms of information systems. Prior to 1976, office systems consisted of IBM Selectric typewriters and IBM mag-card machines. When the center opted for a CRT-based WP system, Odisho discovered an additional hurdle beyond that of finding a satisfactory system. Nestled on the mid-Florida coast, hard by the sleepy villages of Titusville and Cocoa Beach, Kennedy Space Center simply was too isolated to attract major vendors. A major requirement for any vendor the center chose would be close proximity in order to provide service and support.

As the cost of systems started to come down, much of the WP work was consolidated and, according to Odisho, the center found the advantages of WP could be applied to other tasks as well.

In 1980, Odisho decided that the personal computer would be the perfect solution for those who needed some word processing, but had other requirements as well. He brought in several vendors to demonstrate their wares and selected Commodore Business Machines, Inc. With more than 100 Commodores installed, Odisho then turned to Convergent Technologies, Inc. and began to install those in September 1982.

Though a small number of IBM Personal Computers, Digital Equipment Corp. Rainbows and others are on the base, Commodore and Convergent Technologies remain the most widespread. When the single OA vendor is brought in, that situation will undoubtedly change. But both Odisho and Gillespie agreed the economic value of the older



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systems will not disappear.

Odisho pointed out that the systems have already provided a payback over the years and that if a particular piece of hardware does not fit in to the overall OA plan, it can still be placed in a situation where it will meet a need. "We are of the opinion that economic life continues long after a system ceases to be technologically exciting. We keep moving equipment to the highest economic purpose it can serve," he said.

"We are of the opinion that economic life continues long after a system ceases to be technologically exciting. We keep moving equipment to the highest economic purpose it can serve."

The personal computers at the space center have served a number of functions in the non-launch-related realm. According to Odisho, many were acquired for word processing, but others have been used for accessing data bases, user programming, spreadsheet analysis, property tracking and as communications devices. Every personal computer purchase must be routed through Odisho's office for approval and must contain a positive statement as to need and cost-justification. Odisho has also set up a loan pool of portable computers including Osbornes and Radio Shack Corp.'s Model 100s for certain immediate utilities.

Though the approval process places some limits on what is brought in, the lack of a preferred vendor list has left the space center with a potpourri of information systems equipment that has made compatibility a mounting problem. Odisho pointed out that there are "clusters of compatibility," but, as Roy Lealman put it, "we have to get our act together on information systems at the center."

In fact, the lack of direction for these systems caused such serious problems for Lealman's KDMS group (akin to a management information systems [MIS] department) that he called for a moratorium on purchasing equipment. "I figured we'd be sorry we had so many different kinds of equipment all over the place," he stated. With Lealman spearheading the effort, Oatt was chartered in early 1983 to focus on the problem.

According to Jim Akin, the equipment in place is so diverse that a centerwide plan became necessary. "Our goal is to have a fully integrated OA system in place so that employees on all levels can have access to the data that will help them do their jobs better. We see OA as a means to improve productivity."

Lealman added, "We've had two monsters: MIS on one side and OA on the other. Now we're trying to erase the road that divides those two."

One of the first steps taken to accomplish that task was a recently completed Datapoint Corp. pilot initiated more than a year ago. The pilot, under the direction of Darwin Brown, a member of KDMS, was designed to provide a gateway for managers back to the center's automated management information systems.

After a parade of vendors displayed their equipment, Brown settled on Datapoint. At its zenith, the pilot had 24 workstations on the desks of executive secretaries around the center, including the director's office. On the executives' desks, hooked by modem to the Datapoint workstations, were Northern Telecom Displayphones. The systems are used for such applications as electronic mail, WP and spreadsheet analysis.

Initially, the pilot met with some resistance. Brown pointed out that accessing data bases requires training, and they "couldn't get the executives to stand still long enough to learn." Secretaries, who had been relatively untouched by the technology on the executive level, were also apprehensive.

To alleviate the problem, Oatt turned to Margaret Rosenberry, computer assistant and former executive secretary, to help familiarize the users with the systems. The secretaries, who were used to typewriters, encountered the dual problem of having to perform their jobs while learning a new technology, Rosenberry said. She formed a user's group and set up a "buddy system" in which the users would help each other out of crisis situations.

Oatt members are confident that when it comes time for overall implementation with a single OA vendor, the vendor will provide the necessary training. They don't think the technology will pose a threat to the workers at the space center.

"This is a technical organization," explained Georgia Brock. "Most of our managers are from the engineering world and are not standoffish when it comes to technology."

Although it didn't meet all his expectations, the Datapoint pilot has been very successful, Brown said. It has whetted a lot of appetites for OA and has gained the interest of many professionals and managers. The Kennedy Space Center plans to stick with Datapoint, he stated, but added that he realizes more is needed: "There simply isn't any single commercial system today that meets our requirements."

With that in mind, Oatt is assuming the vendor chosen to implement the overall OA plan will subcontract work to other vendors to solve specific needs. Oatt might, in fact, look to a systems integrator rather than a manufacturer to handle the implementation if such a bid is made.

Among the goals upon implementation is to allow access to the various data bases within the KDMS arena as well as data bases of the many contracting organizations that inhabit the space center (there are more than 12,000 contract workers at the base). These data bases will facilitate such needed applications as problem tracking, work control and modification management.

As the excitement builds for OA, interest has also increased in improved communications. Larry Grimes explained that planning for an overhaul of communications at the base began three years ago, and his group has been getting a sampling of user needs ever since. "We're like a small town here. We have users everywhere and office automation is drawing a lot of attention to telecommunications."

The center currently has a GTE private branch exchange and a Develcon, Inc. pure data switch in place. Grimes foresees the need for gateway switchers to handle the information flow from the local-area networks already in place in several buildings. He predicted 3,000 to 5,000 connections initially, with growth up to 10,000. The center is also installing a fiber-optics network, which Grimes said "is the wave of the future."

Coincidentally with the Kennedy Space Center's OA project, Nasa has begun developing an overall OA plan for the entire agency. A Strategic Office Automation Planning (Soap) committee has been formed with members coming from all the agency's centers. The committee meets once a week via teleconferencing to monitor what is transpiring. According to Akin, a member of that committee, a report is due out in May with overall recommendations.

Gillespie doesn't anticipate conflict with the agency. "We intend to make sure what we buy is compatible with what Nasa does. Conceivably, we'll have the best of both worlds."

Rifkin is senior writer for Computerworld OA. OA

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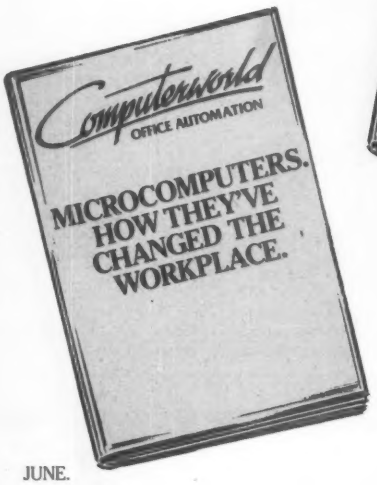

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A New Generation Of Software

By David A. Boucher

Choosing office systems forces some tough decision making on users faced with the wide array of technologies now available, and those choices won't be getting any easier.

Hardware technology is an important element in the comparison of systems, but the decision should not be based on hardware considerations alone. A new generation of applications software with sophisticated features will be the driving force behind the automated office. Fully utilizing the power of the 32-bit workstations just beginning to move out of engineering environments and into the office, this generation of software goes far beyond simply performing more advanced analytical or number-crunching tasks.

A key software feature that will lead to increased utilization of office automation technology is an advanced user interface. This interface will enable users to work with the system in an intuitive way; it includes features such as mice, icons and windows.

For specific applications such as document production — which includes everything from client proposals and management reports to technical manuals — two other features will advance the use of office systems. The first, advanced text formatting capabilities, includes multi-font features and facilities for easily modifying the overall format of a document (for example, changing margins and indentations). The second feature consists of graphics capabilities fully integrated with text editing features, and it allows users to produce illustrated documents easily.

For a system to be truly easy to use, a number of features need to be built into the software technology. A feature rapidly growing in popularity is the mouse, a hand-held pointing device that enables the user to move the cursor on the screen without using the keyboard.

Icons are another increasingly important way of making software systems easy to use. Icons pictorially represent objects or functions; users select or operate them by pointing to them with the mouse-driven cursor, rather than through keyboard entry.

Advanced user interfaces also often use a window system. Windows are a way of organizing a CRT screen to allow simultaneous presentation of data from different applications. Windows also allow the overlaying of Help messages, command menus or other useful information on top of or next to the material a user is currently editing or examining.

However, a window system by itself is no guarantee that software is easy to use. It is essential that the windows be used properly by individual applications (such as text processing, graphics and spread sheet) available on the system. By working together with the specific applications packages to present related data and choices to the user, windows enable the user to operate efficiently in performing complex tasks.

Windows are particularly helpful in integrating text

IRENA ROMAN

with graphics. For example, a user can decide in the middle of preparing a report that he wants to add a bar chart to represent graphically the data presented in the text. He might call up a window that would appear over or next to his text, select the type of chart he wants to insert from a set of choices presented in the new window, then create that graph. When the graph or diagram is positioned correctly within the text, the window disappears.

Xerox Corp.'s Alto system, an internal project of the Xerox Palo Alto Research Center, represented a major step forward in advanced user interfaces. It attempted to give users multifront text and graphics capabilities through a set of simple and consistent commands. Out of this research came the Xerox Star System, the first commercially available OA product with a mouse/window/icon-based user interface.

The user interface design of the Star was largely successful, but newer generation systems just emerging have greater speed, responsiveness and — most important — substantial additional design advances to make them even easier to use.

Seeking to make fundamental advances in text editing and formatting technology, a group of researchers at MIT, led by Michael Hammer, undertook the Etude project. Etude was state-of-the-art research in developing an entirely new approach to using computer technology to produce documents, and it started with a fundamental change in perspective. Rather than focusing on merely editing lines of text and strings of characters, the Etude researchers looked into how the higher level structure of a document was used to present information most effectively, and they worked toward developing techniques to allow that structure to be modified easily. They focused on the entire format structure of a document, from the type fonts used to the paragraph margins, leading-line indentations and so on.

The Etude researchers developed more intuitive techniques for creating documents; their structured document editor represents a breakthrough in easy-to-use multifont text editing and formatting systems.

The structured document editor enables a user to modify the structure of individual components (for example, paragraphs, section headings and titles) easily and rapidly and to see the changes instantaneously.

Unlike standard text editors or even more advanced dedicated WP systems which permit extensive rearrangement of blocks of text, a structured document editor gives the user a much more global perspective and complete control over the entire document. For example, by issuing only one command, a user can change all section headings throughout a document to boldface.

The generation of commercial software surfacing today incorporates the breakthroughs in user interfaces achieved in the 1970s, using multiwindow environments and, often, pointing devices such as the mouse.

Other advanced features are also possible with the new hardware and software technology. Not only is this generation of software more responsive, but also it opens new creative outlets for users, such as the ability to produce documents that make use of the rhetorical value of multifont typography and the efficient presentation of data with graphics.

By means of these new options, users can think about the immediate visual impact of the documents — for example, the way the form of a graph will affect the reader's perception of the data. Many clerical people find an avenue for developing new skills that increase their value within a company as well as their personal productivity and accomplishment.

One major issue with new-generation systems — and one that particularly concerns management information systems (MIS) directors — is compatibility with existing equipment. If new technology is going to find a place in offices where a substantial base of older equipment already resides, software designers must provide special features for translation of data from external sources. In addition, they must also provide communications facilities that allow new equipment to be connected with older systems.

By means of heuristic programming techniques originally developed through research in artificial intelligence, facilities can be developed to allow communication with systems not specifically foreseen by the software developers. These facilities will further enhance the ability of a new system to fit into an environment populated by a variety of other equipment.

In years past, hardware from different vendors was largely incompatible from the software standpoint. Computer language implementations were frequently inconsistent; to achieve acceptable performance in spite of the limitations in the power of the hardware, programming often had to be done in machine-specific assembly language. More recently, software developers have been able to write sophisticated applications programs entirely in high-level languages that are consistent from machine to machine. This allows software transportability — the same program can be found on many different hardware systems, produced by a variety of manufacturers.

Transportability of software has freed software developers from dependence on a single hardware vendor. It will dramatically accelerate the rate at which new-generation software becomes available to improve OA systems.

Transportability of software has freed software developers from dependence on a single hardware vendor and will in turn free the user from being tied to any one piece of equipment. Transportability also has a tremendously stimulating effect on the rate of software development in the industry; it will dramatically accelerate the rate at which new-generation software becomes available to improve OA systems.

One aspect of the new-generation of software stands out as being of primary importance for future applications: its ability to integrate and centralize in the office functions previously handled separately or even out-of-house — for example, producing documents with multifont text, graphics and diagrams. This software offers users many different approaches to graphics, from drawing a pie chart directly on the screen within the text, to using the mouse to draw user-defined diagrams. The user makes the important aesthetic decisions.

Therefore, the new-generation software not only increases productivity through faster and more efficient production of documents, but it also enhances the communication of information — which is what OA is all about.

This integrated software was made possible by the advent of more powerful desktop workstations — the 32-bit systems now sold by Sun Microsystems, Cadmus, Apollo Computer, Perq Systems and others. Software to fully utilize these advanced systems has been lagging.

The generation just emerging will open up a number of new applications, increasing productivity and communication. Among them will be decision support systems (such as natural language data base query and project scheduling programs), computer-aided design and expert systems using artificial intelligence techniques to provide sophisticated problem analysis.

Those on the leading edge of this technology will offer systems that enable users to work intuitively with their data, allowing them to prepare and analyze information quickly, easily and efficiently. OA

Boucher is the president and cofounder of Interleaf, Inc., a software company based in Cambridge, Mass.

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OA Q&A

Tony Abbott is president of Commercial Software, Inc. of New York, an applications software firm with products geared to telecommunications management during postdivestiture. He is chairman of the Association of Data Processing Service Organizations (Adapso), Inc.'s dialog committee with AT&T and has kept an eye on problems facing telecommunications managers.

What are the key communications issues during divestiture?

For users, the era of the single-source telephone system is a thing of the past; a very simple procedure like ordering a new telephone is now complicated. For instance, when you order a phone from AT&T Information Services, the building wiring must be installed by a local operating company and perhaps you order a Wats line from AT&T Communication. The user has to coordinate all of these activities.

Productivity within the communications management group has been dramatically and adversely affected. The telecommunications manager also has a big people shortage problem; there aren't enough qualified people out there. In addition, the feasibility of delivering a high level of service to his organization is impaired because of the traditional vendor reponsibility problem. Whose problem is it? Who do I call? How do I get them to respond?

His other big problem is turmoil with rates, tariffs and pricing. Costs are unclear, and to gain control,large organizations must confront some unknowns that require a fair amount of analysis.

What about the technology? How is that being affected?

It's hard enough to to manage and control what's already in place, and divestiture hasn't helped. Some people are assimilating the new technology fairly well and are able to evaluate it, and others are not. Major changes had already occurred in telecommunications management with the arrival of voice-mail, electronic mail, teleconferencing and other equipment and services. Now the manager's energies have been diverted toward more day-to-day mundane issues and away from keeping pace with new offerings and how they might best fit into his organization.

How will all this affect OA?

I think you'll see AT&T announcing some computer processors that look very much like what Wang or IBM offers. Clearly, AT&T has an advantage — it knows how to deploy equipment throughout an organization very easily. It's also dealing with a buyer who has traditionally bought from AT&T. It may very well have a larger impact on OA than most people suspect. AT&T is having some problems getting its product out the door, but when it does, it will be based on some very current technology. I think it will be a major player.

What about software issues?

The telecommunications function is the most information-intensive job in a large organization. Every time someone picks up a phone, a record is created. To move a phone, you have to worry about a whole variety of records, not the least of which is the corporate directory.

Keeping records on how things connect; charging users and making them aware of what's causing outside expenses to incur; improving the productivity of people dealing with outside vendors — these are important issues.

Have some of the changes you've seen surprised you?

When it became clear what the initial form would be after divestiture and that the Bell system was going to be broken up, we felt pretty sure it would create tremendous management problems. The task of managing telecommunications is so information-intensive we knew we would have a major opportunity to help. We think there's a billion-dollar market in telemanagement systems.

Telecommunications seems to have been a hardware-intensive business up to now. Will software take a larger role?

Software is going to become a big part of it, and telecommunications suppliers themselves will provide a lot of the standard protocol interfaces in the software that meets some of the communications requirements. OA

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BILLERICA, Mass.— The **Commterm, Inc.** EVX-1000 voice messaging system can now be integrated with the Northern Telecom, Inc. SL1-digital business communications system. The PBX integration reportedly provides SL-1 system users with automatic telephone answering capability, delivers a greeting in the person's own voice, stores the caller's message and notifies the called party through the use of a message-waiting lamp or tone. The called party can retrieve the stored message at any time from any push-button phone in the world.

The EVX-1000 has also been integrated with the Ericsson Information System ASB-900, designed for PBX integration, and the Plessey Co. Ltd IDX communications system. Subscriber costs are approximately $75 per user per year from Commterm, Inc., 900 Middlesex Turnpike, Building 5, Billerica, Mass. 01821.

CAMBRIDGE, Mass.— A multifunction IBM PC software package combining relational data base, presentation-quality business graphics, a spreadsheet, word processing and communications from one IBM PC to another or to a mainframe is being offered by **Mosaic Software, Inc.**

The package, called Integrated-6, reportedly allows information to be created and stored; analyzed; displayed graphically; combined and consolidated; transferred among modules or from one computer to another; and output in a variety of formats for presentation. It requires 256K bytes of memory.

Integrated-6 will be sold for $495 from Mosaic Software, Inc., 1972 Massachusetts Ave., Cambridge, Mass. 02140.

CUPERTINO, Calif.— **Apple Computer, Inc.** has announced Appleline, a coaxial attachment unit designed to connect Apple personal computers to an IBM or IBM-compatible network. Appleline connects the Macintosh, Lisa and Apple III to 3270 cluster controllers and reportedly allows the user to access information stored within the IBM mainframe network from local and remote environments.

Each Appleline supports one Apple computer and requires only minimal changes to the host software. The Appleline costs $1,295 from Apple Computer, Inc., 20525 Mariani Ave., Cupertino, Calif. 95014.

DELRAY BEACH, Fla.— The IBM Portable Personal Computer, a lighter and smaller version of the IBM PC, was introduced by **IBM.** The portable, priced at $2,795, will be available in limited quantities initially. It will feature 256K bytes of memory (expandable to 512K bytes), a built-in 9-in. amber monitor, a

IBM's Portable PC

360K-byte slimline diskette drive and adapter and a color/graphics monitor adapter. It reportedly weighs 30 lbs.

The product uses the 16-bit, Intel 8088 microprocessor with IBM's PC-DOS operating system.

IBM also introduced its Personal Computer Cluster program, which reportedly supports the connection of up to 64 IBM PCs. A Cluster Program license is required for each system, and IBM is offering a Five-Pack available with one program diskette, five publications and licenses permitting use of the program on five machines. A typical cluster might include five computers; with licenses, adapters and cable kits, such a configuration would cost $2,540 from an IBM Product Center.

For more information contact: IBM Entry Systems Divsion, P.O. Box 2989, Delray Beach, Fla. 33444.

IBM also unveiled a new version of its System 9000, the 9002 desktop computer, a Motorola 68000-based system that reportedly runs an optional Xenix operating system. The 9002, aimed at the engineering, scientific and business market, can operate as a stand-alone unit or, with Xenix, as a host supporting three attached terminals.

The 9002 has 128K bytes of random-access memory, expandable to 5.2M bytes. Up to four 10M-byte hard-disk drives, four 5¼-in. or 8-in. diskette drives and a system printer can also be added.

The 9002 will be priced at $6,495 for the system unit, display, keyboard and standard operating system. The Xenix operating system and its licensed programs will be available for a one-time license charge of $995. The system is scheduled for second quarter 1984 from IBM, 900 King St., Rye Brook, N.Y. 10573.

ANDOVER, Mass.— **Software International Corp.** unveiled a real-time link between its mainframe general ledger package and a variety of applications that run on the IBM PC.

The product, Smart Link, reportedly enables PC users to extend the data extraction and manipulation resources of the company's on-line General Ledger and Financial Reporting System at the micro level. The product is said to provide for on-line, real-time extraction of live data and does not use any batch processing mechanisms to create a shadow file accessed by the micro.

Smart Link is available for $2,995 per micro from Software International, One Tech Drive, Andover, Mass. 01810.

SANTA CLARA, Calif.— A fiber-optic, Ethernet-compatible local-area network, reportedly the industry's first, was announced by **Ungermann-Bass, Inc.** Called Fiber Optic Net/One, the product is an expansion of the company's existing baseband and broadband systems and reportedly has added advantages of optical fiber, such as noise immunity, secure transmissions and longer network distances.

Fiber Optic Net/One is available in single or multiple cable configurations and operates at a 10M bit/sec data rate. The cost of an entry-level system starts at approximately $25,000. A typical fiber-optic Net/One with 200 device interface ports would cost $135,000, Ungermann-Bass said from 2560 Mission College Blvd., Santa Clara, Calif. 95050.

BOSTON, Mass.— **Altertext, Inc.**, a developer and marketer of media conversion systems, unveiled the Altertext Communicator, an advanced protocol converter that reportedly permits direct exchange of text, codes and commands among previously incompatible word processors, typesetting equipment and computers. The product translates all codes and format commands so that information can be retrieved on equipment from numerous vendors' products, including IBM PCs, Wang Laboratories, Inc. and Lanier Business Products, Inc. word processors and various other personal computers.

The Altertext Communicator

The system consists of a Z80 microprocessor with 64K bytes of memory, a 9-in. diagonal CRT and a detachable keyboard. Both asynchronous and bisynchronous interfaces can be used with the Altertext Communicator. The company also announced media conversion software programs for the Altertext Communicator. The Altertext Communicator is available for $7,500 from Altertext, 210 Lincoln St., Boston, Mass. 02111.

KING OF PRUSSIA, Pa.— **Integrated Technologies, Inc.** announced the expansion of its Soft-Switch Document Control System (DCS) to include support for IBM's Professional Office Support System (Profs). This reportedly allows users of diverse products such as Wang, Xerox Corp., NBI, Inc. and IBM personal computers to exchange revisable form documents with Profs users.

The interface to Soft-Switch for the Profs user is integrated with the standard Profs mail system. This allows Profs users to send revisable form documents to Soft-Switch-supported OA devices by executing ITI-supplied Profs commands. Soft-Switch automatically translates the Profs DCF format to the revisable form at the destination system.

The Soft-Switch interface for Profs is available for $10,000 from Integrated Technologies, Inc., 200 N. Warner Road, King of Prussia, Pa. 19406.

WESTBORO, Mass.— **Data General Corp.** has introduced a communications interface that reportedly permits direct communications between IBM mainframes and DG's Desktop Generation, Eclipse S/20 and Eclipse C/30 low-end processors. The product, the ISMC/2 is a two-channel front-end intelligent synchronous micro controller board that enables its processors to offload high-speed synchronous communications for more efficient file transfer and interactive communications. The product is available for $1,650.

DG also announced enhancements to its Comprehensive Electronic Office system (CEO) that reportedly let CEO offer portable hard-copy terminal access, Telex capability and an integrated typesetting function.

In addition, DG became the first office vendor to announce an agreement with one of the recently liberated AT&T operating companies. The agreement between DG and Pactel Communications Systems — a subsidiary of Pacific Telesis Group — calls for Pactel to offer DG's CEO system in their headquarters and sales offices in California.

For more information contact Data General, 4400 Computer Drive, Westboro, Mass. 01581.

STAMFORD, Conn.— **Exxon Office Systems Co.** announced the Exxon 750 Professional Workstation, which reportedly extends the Exxon Business Support System to executives, managers and professionals. The Exxon 750 reportedly can handle text editing, electronic spreadsheets and business graphics in multiple windows. It has a high-resolution, monochrome, bit-map display and

TECHNOLOGY

The Exxon 750

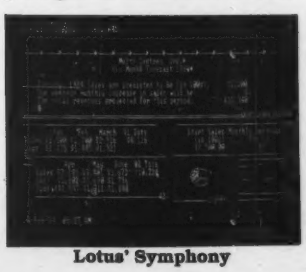
uses floppy and hard-disk storage with a main memory of 512K bytes. It will run both 8-bit and 16-bit applications software and permits the user to move back and forth from text to numeric and graphic operations without changing programs, the vendor said. Exxon has also announced support for MS-DOS for the product.

The Exxon 750 is an addition to Exxon Business Support System, which has at its core the Unix-based 8400 Series controller. The 750 will be available in the second quarter for $7,750 from Exxon Office Systems, 771 Long Ridge Road, Stamford, Conn. 06902.

SAN JOSE, Calif.— The Automatic Speech Exchange Network (Aspen), a voice message system, was introduced by **Octel Communications Corp.** Aspen, reportedly a compact, high-performance computer and disk system offers any business that uses a private branch exchange or Centrex the ability to exchange information via telephone without requiring simultaneous participation by the caller and receiver. The system offers the lowest cost per user of any high-performance voice message system on the market and is capable of interfacing with any PBX on the market, the vendor said.

Aspen includes automatic delivery of recorded messages to lists of people; message forwarding; the ability to edit messages, add comments and redirect messages; and delivery of messages at a prearranged time. The Aspen system will be available in June for $55,000 (for 100 to 200 users) from Octel, 1841 Zanker Road, San Jose, Calif. 95112.

CAMBRIDGE, Mass.— **Lotus Development Corp.** introduced Symphony, an all-in-one software package that claims to be the first complete business productivity tool offered for the desktop and portable microcomputer market. Symphony combines word processing, a data base with forms and mail merge capabilities, state-of-the-art communications, an advanced spreadsheet and business graphics. Symphony also offers windowing capabilities, which work in conjunction with all of the packages functions.



Lotus' Symphony

Symphony features WP with multiple documents on screen, and mail-merge capability; forms-oriented, multiple data base capability; communications that includes terminal emulation, asynchronous operations, point-to-point file transfer of any file; window management with simultaneous display of spreadsheets, documents, forms and graphs on screen.

Symphony requires a minimum of 320K bytes of random-access memory and is initially offered for $695; Lotus is offering current registered Lotus 1-2-3 users a credit for the full price of that program toward the purchase of Symphony. The company said it would continue to sell, service and support 1-2-3 for users who choose to stay with that product.

More information is available from Lotus Development Corp., 161 First St., Cambridge, Mass. 02142.

LOWELL, Mass.— **Wang Laboratories, Inc.** introduced the Wang OIS 60, a clustered information processor for small and medium-size businesses.

The product offers advanced word processing, a range of optional software applications, and networking capabilities. It has 33.5M bytes of fixed-disk memory supporting up to eight users and five peripheral devices such as communications facilities, printers and tape drives. Four of the workstations can be any standard OIS workstation, and four can be "internal" OIS devices with logic and memory housed within the master.

The OIS 60 will support up to 10 Wang printers, including the OIS-PTR20, a 20 char/sec daisy printer. The OIS 60 will also support the Wang Systems Networking for information processing between Wang systems over local- and wide-area networks.

The OIS 60, which includes work processing, utilities and advanced systems software, costs $9,000. from Wang, One Industrial Ave., Lowell, Mass. 01851.

MAYNARD, Mass.— **Digital Equipment Corp.** has announced a new video monitor with a touch screen interface. The monitor, called Dectouch, is a color graphics display unit that reportedly responds to a variety of input devices such as a finger, joystick, mouse, as well as a standard keyboard.

The VRTS1 Dectouch monitor

Dectouch

was designed for use with the Professional 350 Workstation.

The monitor, with connector panel and internal controller, is available for $3,295 from Digital Equipment Corp., 125 Main St., Maynard, Mass. 01754.

PALO ALTO, Calif.— A fast 11-in. by 17-in plotter featuring 31.5 in/sec plot speed and 6G acceleration has been introduced by **Hewlett-Packard Co.** The plotter, the HP 7550A, is available with automatic cut-sheet paper feed.

Other features include a liquid-crystal display with function keys for reporting plotter status and program messages.

The HP 7550A is available for $3,900 from HP, 3000 Hanover St., Palo Alto, Calif. 94304.

PALO ALTO, Calif.— **Xerox Corp.** has reduced the price of its current Star 8010 network workstation from $15,055 to $9,995. Xerox also announced two new models of the Star 8010 information system. The remote workstation, which can reportedly transfer information through a private branch exchange to an Ethernet network, is available for $9,995. The company also unveiled a stand-alone version of the Star, available for $8,995 from Xerox Office Systems Division, 3333 Coyote Hill Road, Palo Alto, Calif. 94304.

CUPERTINO, Calif. — **Tandem Computers, Inc.** has expanded its line of terminals with the introduction of the 6531 and 6532 models and has reduced the price of the existing 6530 terminal.

Tandem has enhanced the entire 6530 family of terminals with the introduction of voice recognition and 3270 emulation.

The 6531 is available for $2,100 and the 6532 for $1,950 Tandem Computers said from 19333 Vallco Parkway, Cupertino, Calif. 95014.

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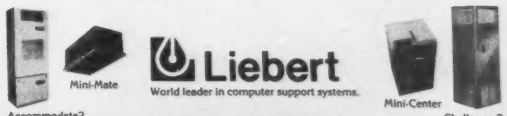

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April 14-19, Dallas — **Computer Graphics '85.** Contact: The National Computer Graphics Association, 8401 Arlington Blvd., Suite 601, Fairfax, Va. 22031.

April 17-18, Washington, D.C. — **Second Annual Broadband Local Networks Forum.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

April 17-19, Atlanta — **Understanding Modern PBX Systems.** Also, May 8-10, New York; May 22-24, San Francisco. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

April 23, Chicago — **The End-User Revolution.** Also, April 30, Boston. Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 23-25, New York — **The Micro-Mainframe Connection.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

April 24-25, San Francisco — **Workspace '84.** Contact: Workspace '84, The Charles Yourd Co., 44 Montgomery St., Suite 500, San Francisco, Calif. 94104.

April 24-25, Minneapolis — **Local-Area Networks: Equipment and Systems.** Also, April 26-27, Phoenix; May 1-2, Raleigh; May 3-4, Boston; May 8-9, Washington, D.C.; May 10-11, San Francisco. Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn., 55424.

April 29-May 2, Phoenix — **Personal Computing: Productivity Tool for Business.** Contact: Laura Greenfield, Director, Marketing, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

April 30-May 4, Boston — **The 1984 James Martin Seminar.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 2-3, New York — **How to Prepare a Strategic Plan for Office Automation.** Also, June 13-14, San Francisco. Contact: BCR Enterprises, Inc., 950 York Road, Hinsdale, Ill. 60521.

May 7-8, San Francisco — **Micro Wars: Shape Up or Shake Out.** Contact: Laura Greenfield, Director, Marketing, International Data Corp., 5 Speen St., Framingham, Mass. 01701.

May 14-16, San Francisco — **Strategic Planning for Office Automation.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 15, Washington, D.C. — **Executive Strategies for the Information Age.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 21-22, New York — **Evaluating Decision Support Software: Personal Computer, Mainframe and Distributed Applications.** Contact: DSS Conference, 215 First St., Cambridge, Mass., 02142.

May 21-23, San Francisco — **Information Center Software Selection.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

May 21-24, Washington, D.C. — **Network Management/Technical Control.** Contact: Communication Networks '84, Box 880, Framingham, Mass. 01701.

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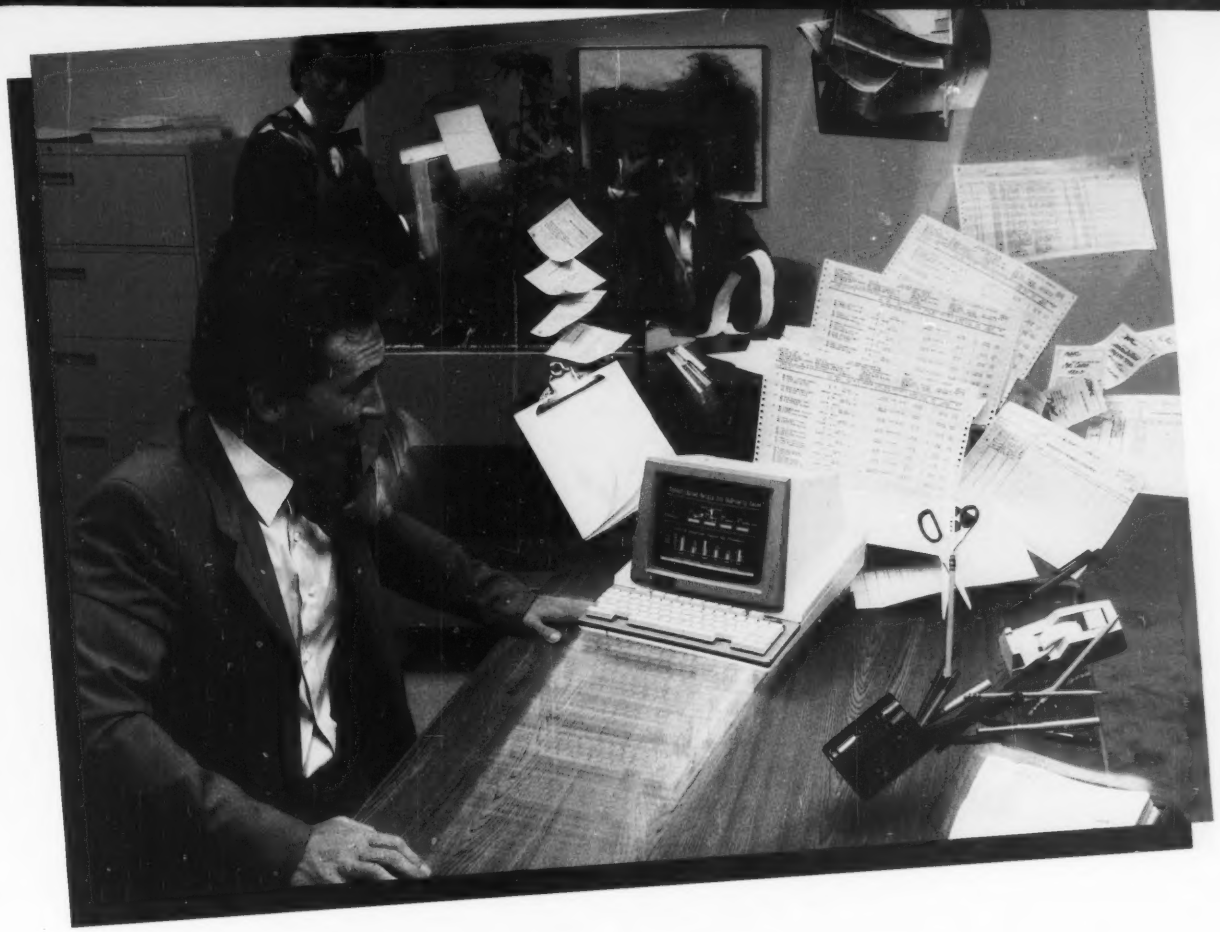

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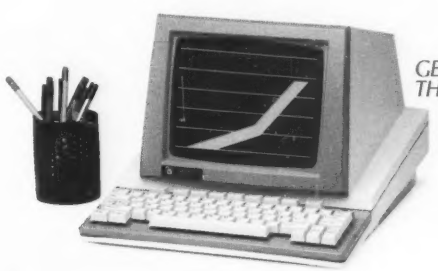

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